Geotechnical Data Report

SR 395 – North Spokane Corridor
Section 1 – Hawthorne Road to US 2
Spokane, Washington

February 6, 2001

Prepared for

Washington State Department of Transportation

Prepared by

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

1.0 INTRODUCTION

This geotechnical data report summarizes the field investigation and geotechnical laboratory testing completed in support of the Washington State Department of Transportation (WSDOT) SR 395 North Spokane Corridor – Section 1 project. The purpose of this investigation was to obtain subsurface information to characterize soil and groundwater conditions along the proposed Section 1 alignment.

The project location is shown on the Vicinity Map, Figure 1. The Site and Exploration Plan, Figure 2, shows the project area and location of the borings drilled for this investigation. A description of the field exploration program, the boring logs summarizing subsurface conditions, and a table summarizing pertinent information regarding each boring, are included in Appendix A of this data report. A description of the laboratory testing program along with the results of the laboratory testing are included in Appendix B of this data report.

Landau Associates was contracted by the Washington State Department of Transportation to provide geotechnical services to support the project. Our services were provided in accordance with on-call geotechnical services Agreement No. Y-7373 between the Washington State Department of Transportation and Landau Associates, Inc., and Task AA, Work Order XL-1154, and our July 28, 2000 Scope and Estimated Cost letter.

Our scope of services included the following specific tasks:

- Drilled 26 borings to depths of approximately 30 to 100 ft below the existing ground surface to characterize soil and groundwater conditions.
- Installed piezometers in selected borings for subsequent measurement of groundwater levels.
- Completed geotechnical laboratory testing on selected samples obtained from the borings. Laboratory testing consisted of natural moisture content determinations, grain-size analyses, and Atterberg Limit determinations. Laboratory testing was completed by Soil Technology, Inc. under subcontract to Landau Associates.
- Prepared and submitted this data report summarizing the field exploration and laboratory testing program, and regional and project site geology.

2.0 PROJECT DESCRIPTION

As shown on the Vicinity Map, Figure 1, the proposed SR 395 North Spokane Corridor Project is planned to connect Interstate 90 (I-90) with US Highway 2 (US 2) and rejoin State Route 395 (SR 395) at the Little Spokane River. As currently proposed, the corridor will extend north from I-90, west of Freya Street, and parallels Market Street until Francis Avenue. The alignment jogs northeast about ¼ mile and then continues northward. The proposed alignment crosses at the junction of Market Street and Hawthorne Road, and then turns northwest and intersects US 2 at Shady Slope Road. The alignment turns westward and ties into SR 395 just south of the Little Spokane River bridge at SR 395.

The Section 1 project extends from Hawthorne Road to US 2. Cuts and fills of up to 75 to 80 ft are proposed to establish road grades through Section 1. Elevated crossings are planned for Market Street, Parksmith Drive, and the BNSF railroad tracks, and undercrossings are planned for Farwell Road and US 2. Interchanges are proposed for Parksmith Drive and US 2.

3.0 GEOLOGIC SETTING

The following sections provide a description of the existing surface conditions and topographic setting, regional geology of the project area, and a description of the various geologic units encountered in the explorations along with a summary of the distribution of the various geologic units encountered in the project area.

3.1 SURFACE AND TOPOGRAPHIC CONDITIONS

The project area lies within the northern portion of the Spokane Valley, west of the unincorporated area of Mead. The surface topography within the Section 1 area is generally gently rolling to nearly flat-lying. The proposed Section 1 route is largely undeveloped, and surface vegetation varies from sparse grassland to pine forest. The route crosses through an aggregate operation and a construction material storage yard between Market Street and Parksmith Drive; a trailer park is located east of the alignment, about 2/3 of a mile north of Hawthorne Road; and scattered single-family residences and small-scale commercial development are centered around Farwell Road and US 2.

Most of the surficial soil observed within the Section 1 area consists of fine and fine to medium sand. These soil types are generally considered to have a moderate to severe potential for wind and/or water erosion. Localized areas of steep slopes (slopes with gradients of 40 percent or more) exist in the Section 1 area. These areas are generally located in the area between Hawthorne Road and Farwell Road, and consist of either dune faces or human-made cuts. Based on the lack of vegetation on many of the slopes and our past experience with similar soil types, many of these slopes appear to be at or near the soil's natural angle of repose and are subject to continued raveling.

3.2 REGIONAL GEOLOGY

Bedrock and sedimentary units in the project area include, from oldest to youngest: metamorphic and igneous rocks, the Latah Formation and Columbia River Basalt Group, Lake Missoula catastrophic flood deposits, and eolian deposits, which are described in the following paragraphs.

3.2.1 PRE-TERTIARY METAMORPHIC AND IGNEOUS ROCKS

The Spokane area is underlain by high-grade metamorphic rocks of the Spokane dome of the Priest River metamorphic core complex. The core rocks have been intruded by Cretaceous and early Tertiary granitic rocks (Boleneus and Derkey 1996). These rocks were deeply eroded, leaving a surface of considerable relief.

These rocks formed a generally northwest trending mountain range with drainages extending into the lowlands to the south. Limited exposures of the Priest River metamorphic complex have been mapped along the base of the hillside in the vicinity of Lincoln Road and Saint Michael Road (Joseph 1990). Exposures of the granitic rocks have been mapped southeast of the intersection of Market Street and Stoneman Road (Derkey 1997), along the base of the hillside in the vicinity of Fairview Road (Kiver, Rigby, and Stradling 1979), and along the west side of SR 395, south of the Little Spokane River Bridge (Derkey, Gerstel, Logan 1998).

3.2.2 TERTIARY VOLCANIC AND SEDIMENTARY ROCKS

During the Miocene Epoch (late Tertiary), between 5 and 24 million years ago, extensive flows of basaltic lava flooded the region, covering the lower valleys and foothills and abutting the higher mountains. The basalt flows covered more than 100,000 square miles in parts of Washington, Idaho, and Oregon. The basalt flows are generally thought to have entered the Spokane area from the south and southwest, probably erupting from vents in the area of the Chief Joseph dike swarm in the southeast corner of Washington (Robinson 1991). In the project area, the individual flows are generally flat-lying and have thicknesses of 50 to 150 ft (Griggs 1973). Two formations of the Columbia River Basalt Group have been mapped in the area: the Wanapum Basalt (Priest Rapid Member) and the Grande Ronde Basalt (Derkey 1997; Derkey, Gerstel, and Logan 1998). The Grande Ronde Basalt is between 15.6 and 16.4 million years old, and is generally designated as "valley" flows due mainly to exposures in valleys around the Spokane area. The Wanapum Basalt is between 15 and 14 million years old and is generally designated as "rim rock" flows mainly because it caps the bluffs in the project area. The basal contact of the Wanapum Basalt is typically about elevation 2,200 ft in the project area (Derkey 1997).

The earlier basalt flows likely blocked stream/river drainages, possibly including those of the ancestral Spokane and Columbia River, forming either a series of lakes (or possibly a single large basin as argued by Robinson [Robinson 1991] based on stratigraphic correlations) along the north and east rim of the basalt field. The basin is generally thought to be arcuate in shape, extending from near Grand Coulee Washington to Moscow, Idaho. Lacustrine sediments, derived from erosion of the older basalts and the pre-Tertiary rocks in the region, were deposited in the basin. These sediments, consisting of primarily silt and clay, with minor sand and gravel, form the Latah Formation. The Latah Formation is generally described as poorly indurated siltstone, claystone, sandstone, and minor conglomerate, containing scattered volcanic ash layers. Little data is available regarding the general depositional nature of the Latah Formation, but sediment was likely deposited by drainages flowing into the basin from the east and north. The Latah Formation generally exhibits an "upward coarsening" sequence, which is typical of lake-type depositional environments.

The Latah Formation discontinuously outcrops along the north and east rims of the basalt field. Outcrops have been mapped as far west as Grand Coulee and near Kellers Ferry, Washington, and encountered in deep wells at Davenport and Odessa, Washington (Robinson 1991). The Latah Formation is exposed along I-90 in the Coeur d'Alene area (ITD 2000) and is intermittently present as far south as Moscow, Idaho (Robinson 1991).

In the general project area, the Latah Formation is estimated to be more than 1,000 ft thick in places (Derkey 1997). Where exposed in the Spokane region, the Latah Formation generally overlies the Grande Ronde Basalt and underlies the Wanapum Basalt. Within the project area, the Latah Formation is overlain by Wanapum Basalt and is exposed on the hillsides east of Market Street at the south end of Section 1 and the northern end of Section 3, and in limited exposures on the hillsides northwest of US 2.

3.2.3 Pleistocene and Holocene Geology

During the Pleistocene Epoch (early Quaternary), 10,000 to 2 million years ago, vast continental ice sheets advanced into the Spokane valley. Evidence indicates that there were at least four to possibly six advances of the continental ice into the region during the Pleistocene (Molenaar 1988). The latest advance, which occurred between about 12,000 and 22,000 years ago, had the greatest effect on the present day landscape. Two lobes of ice advanced into the area: the Pend Oreille lobe, which is thought to have advanced west down the present day Spokane River Valley to as far as the eastern city limits (Weis and Richmond 1965); and the Little Spokane lobe which is thought to have advanced southward to near Milan (Weis and Richmond 1965), about 15 miles north of the project area. Melt water deposits, chiefly of sand and gravel, with silt and clay, were deposited in and along the valleys of the Little Spokane and Spokane Rivers. In addition, a proglacial lake, known as Lake Columbia, occupied much of the Spokane Valley during the Pleistocene. Remnants of the lake sediments exist in tributary valleys such as the Peone Prairie north of Spokane (east of the project area). The glacial lake deposits consist predominantly of sand, silt and clay with scattered drop stones.

Glacial ice of the Purcell lobe is thought to have periodically blocked the Clark Fork River near the present day Idaho/Montana border, forming a great ice dam across the valley. Melt water from other ice lobes further up the Clark Fork River drainage became impounded behind the ice dam, forming a vast lake in present day western Montana referred to as Glacial Lake Missoula. At its highest level, the lake covered an estimated 3,000 square miles and contained an estimated 500 cubic miles of water (Molenaar 1988). Periodically the ice dam failed, releasing an enormous volume of water that flowed across the landscape. It has been speculated that the entire lake may have drained within a few days, resulting in a peak flow across the Columbia Plateau at 750 million cubic feet a second (Molenaar 1988). The majority

of this flood water rushed through the Spokane River and Little Spokane River valleys en route to the Columbia River.

Flood waters inundated the Spokane area to a maximum elevation of 2,700 ft (Derkey 1997). Though the number of Pleistocene flood events are unknown, each flood event likely swept down the Spokane and Little Spokane River valleys scouring deposits of the previous flood events, cutting new channels into the pre-Pleistocene bedrock, and leaving behind new deposits of boulders, cobbles, gravel, and sand. In less energetic environments, slack water deposits of chiefly sand and lacustrine sediments were laid down. The maximum thickness of the flood deposits in the Little Spokane River Valley are on the order of 500 ft (Derkey 1997).

Surficial deposits of wind-blown sand (Holocene [present to 10,000 years ago] and Pleistocene Epoch) are present over the flood deposits over much of the project area, south of Farwell Road. The wind-blown deposits are derived primarily from Pleistocene flood deposits that mantle much of the project area.

3.3 PROJECT GEOLOGY

In the immediate project area, the near-surface geology between Parksmith Drive and Farwell Road generally consists of wind-blown (eolian) sand deposits (Qes) overlying Pleistocene flood deposits (Qf). Southwest of Parksmith Drive, the wind-blown sand deposits were not always present at the surface. Field observations and review of the Mead 7.5 minute topographic map (USGS 1981) indicate that past mining activities likely removed much of the wind-blown sand deposits between Market Street and Parksmith Drive. Between Farwell Road and US 2, Pleistocene flood deposits (Qf) were present to the depths explored. The Pleistocene flood deposits were observed in the borings to be interfingered with finer-grained deposits, interpreted as slack-water deposits laid down during the Pleistocene floods (Gerstel 2000).

The wind-blown deposits observed in the borings generally consist of a loose to medium dense and occasionally dense, homogeneous, poorly graded, fine and fine to medium sand. The sand was typically light brown to brown in color with subangular to rounded grains. The sand generally shows a strong reaction to hydrochloric acid (HCL). The thickness of the wind-blown deposits was observed to vary from about 5 ft in boring PRK-3-00 to about 40 ft in boring PH1-6-00. South of Parksmith Drive, the wind-blown sand was not present at borings locations PH1-1-00, DP-1-00, DP-2-00, and DP-3-00; and in the vicinity of Farwell Road, the wind-blown sand was not present at boring locations DP-13-00, DP-5-00, DP-13-00, US2-1-00, US2-2-00, and US2EB-1-00.

The Pleistocene flood deposits were encountered beneath the wind-blown deposits or at the surface in all of the borings and generally extended to the depths explored. The deposits are generally

coarser-grained than the wind-blown deposits and consist of medium dense to dense, and occasionally very dense, homogeneous, well graded to poorly graded, fine to medium and fine to coarse sand, occasionally with a trace of fine gravel. The sand was typically light grayish-brown to brown in color, with subangular to rounded grains. Reaction to hydrochloric acid (HCL) was generally strong, but occasionally weak to none. These deposits are consistent with a lower energy environment, such as at the margins of the flood, in back waters, or as the flood waters receded.

Interfingered with the Pleistocene flood deposit are interbedded, fine-grained deposits of stiff to very stiff, lean clay; and medium dense elastic silt and sandy silt; over and interbedded with deposits of medium dense, silty fine sand. These deposits were encountered in borings DP-3-00, DP-4-00, DP-5-00, DP-12-00, DP-13-00, FARW-2-00, FARWSB-1-00, PH1-1-00, PH1-4-00, PH1-5-00, PH1-6-00, PRK-2-00, US2-1-00, US2-2-00, and US2SB-1-00. The deposits were observed in the borings to be highly variable in vertical thickness and lateral extent. In the borings, the thickness of the deposits varied from a single layer less than 6 inches to interbedded deposits between 4 to 6 ft thick. In boring DP-4-00, the sequence of fine-grained deposits was about 12 ft thick. Lean clay and elastic silt were observed in the borings to vary from homogenous to stratified, while the sandy silt deposits are typically homogeneous. The deposits show a variable reaction to HCL, from nonexistent to strong. These units are interpreted to be slack-water deposits laid down during the Pleistocene floods. These deposits are often overlain and underlain by, and occasionally interbedded with, the lower energy flood deposit of well graded and poorly graded sand.

3.4 GROUNDWATER

Groundwater was encountered at the time of drilling in borings DP-5-00 and PH1-8-00 at a depth of about 25 ft below the existing ground surface. Wet soil was encountered near the bottom depth of borings DP-12-00, FARW-1-00, and FARW-2-00, which may indicate that groundwater is near that depth. In several borings (PH1-6-00 and US2-2-00), introduction of drilling fluid into the formation during drilling masked the presence of possible groundwater that may have been encountered during drilling. Piezometers were installed in 19 of the borings for subsequent measurement of groundwater levels. Table 1 summarizes groundwater levels measured in the piezometers between the dates of December 6, 2000 and January 22, 2001. Groundwater depths were measured by a representative of WSDOT. If present, the first two groundwater measurements at each boring location are shown on the summary logs in Appendix A.

4.0 USE OF THIS REPORT

This geotechnical data report was prepared for the exclusive use of the Washington State Department of Transportation for specific application to this project. The use by others, or for purposes other than intended, is at the user's sole risk. The findings, recommendations, and opinions presented herein are based on review of readily available geologic information, field explorations, and our understanding of the project requirements. Within the limitations of scope, schedule, and budget, information presented in this data report was prepared in accordance with generally accepted professional geotechnical engineering principles and practices in this area at the time this document was prepared. We make no other warranty, either express or implied.

We appreciate the opportunity to provide these services to the Washington State Department of Transportation and look forward to providing further assistance on this project. Please contact either Mr. Edward J. Heavey at 253-926-2493 or Mr. Dennis Stettler at 425-778-0907 if you have any questions regarding the information contained in this data report.

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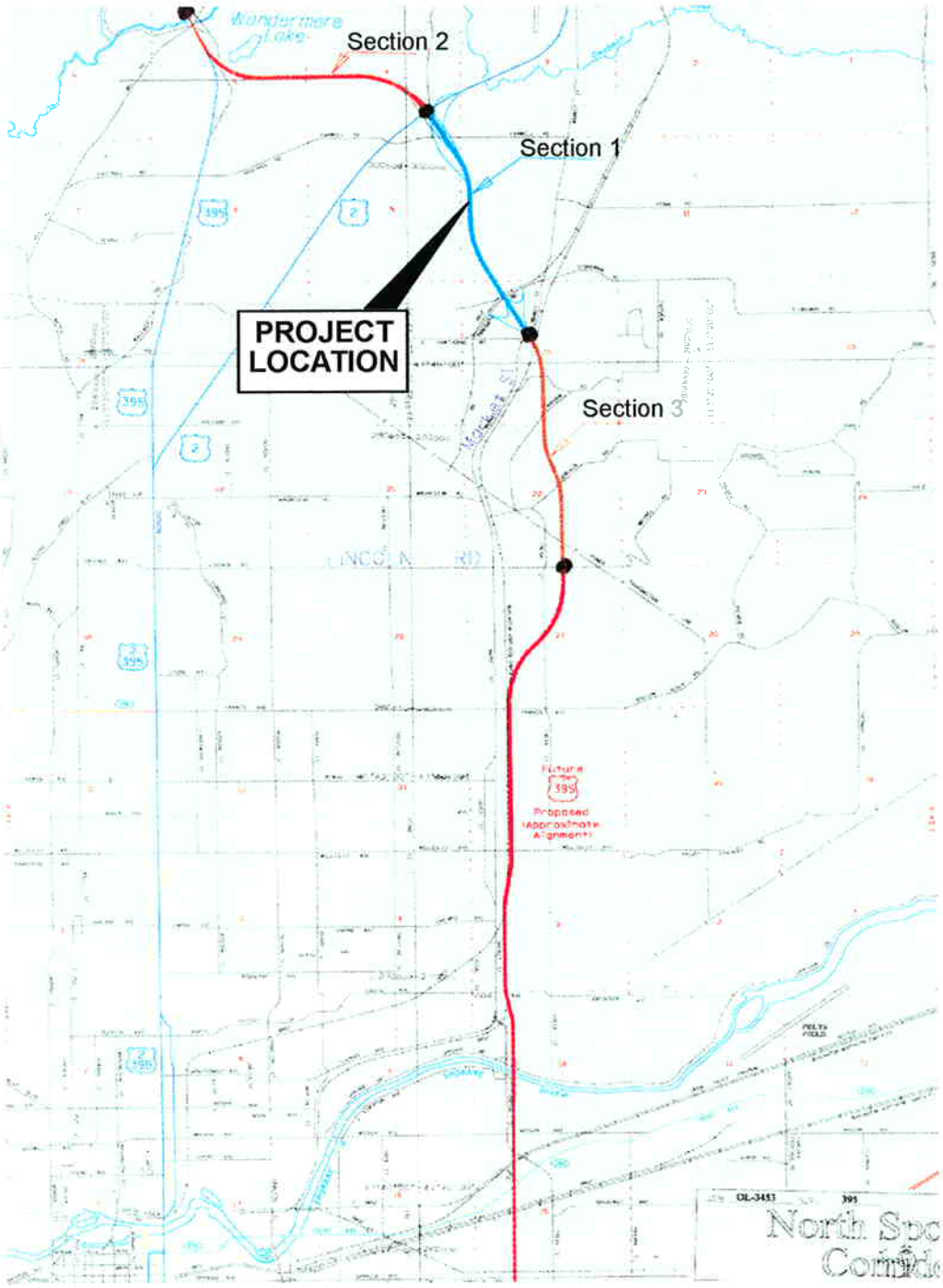
TABLE 1
GROUNDWATER DATA

Boring No.	Ground Elevation (ft)	Depth to Water (ft)							
		Dec. 6, 2000	Dec. 15, 2000	Jan. 5, 2001	Jan. 8, 2001	Jan. 10, 2001	Jan. 19, 2001*	Jan. 20, 2001*	Jan. 22, 2001*
DP-1-00	1932.0					Dry			
DP-2-00	1922.4					Dry			
DP-3-00	1900.3	Dry	61.8		61.4	61.7			Dry
DP-4-00	1856.9	Dry	Dry		Dry	Dry			
DP-5-00	1841.2	29.3	29.3		28.6	29.1		27.8	
DP-12-00	1838.3			51.9			51.8		
DP-13-00	1840.6		33.7					33.5	
FARW-2	1847.5	52.0	52.1	52.2	51.7		52.2		
FARWSB-1	1861.0		41.3		40.9	41.3	41.3		
PH1-2-00	1930.2					Dry			
PH1-4-00	1907.9	Dry	Dry		Dry	Dry			
PH1-5-00	1908.8	Dry	Dry		Dry	Dry			Dry
PH1-6-00	1941.7	85.5	88.6		87.4	87.3			
PH1-7-00	1909.2	Dry	Dry		Dry	Dry			
PH1-8-00	1836.1	23.9		26.4	28.6			26.0	26.7
PRK-1-00	1925.8					Dry			
PRKSB-1	1932.0					31.0			
US2-2-00	1838.1	23.1	23.1		23.3	23.3		23.1	
US2EB-1-00	1835.5	19.8	19.9		19.6	20.0		20.0	

* Water levels measured after pumping



No Scale

Base drawing provided by WSDOT

North Spokane Corridor XL1154 I:\project\244\004.10\vicinity.FH8 12/15/00

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WSDOT SR 395 North Spokane Corridor Project Spokane, Washington	**Vicinity Map**	Figure 1

N

US2

Shady Slope Road

Farwell Road

DP-5-00

US2-2-00

US2-1-00

US2EB-1-00

PH1-8-00

DP-13-00

FARW-3-00

FARW-1-00

DP-12-00

DP-4-00

FARSWB-1-00

PH1-7-00

DP-3-00

PH1-6-00

PH1-5-00

Proposed North
Spokane Corridor

Matchline

0 500 1000

Scale in Feet

Matchline

PH-4-00

PH-3-00

Proposed North
Spokane Corridor

PH1-2-00

Parksmith Drive

PRK-2-00

DP-2-00

PRK-1-00

PRK-3-00

DP-1-00

PH1-1-00

PRKSB-1-00

Market Street

Hawthorne Road

MRK-1-00

Legend

DP-2-00 Boring Location

Reference: Base Drawing Provided by WSDOT

WSDOT/SR395 | T:\244\00410401\Fig2.dwg (A) *Figure 2* 12/27/2000

Landau Associates

WSDOT SR395 North Spokane Corridor Project Spokane, Washington	**Site and Exploration Plan Section 1- Market St. to US#2**	Figure 2

APPENDIX A

Field Explorations

APPENDIX A
FIELD EXPLORATIONS

Subsurface conditions for the Section 1 portion of the North Spokane Corridor project were explored by completing a series of 26 borings along the proposed route. The location of the borings are shown on Figure 2. The borings were completed to depths of approximately 30 to 100 ft between the dates of September 26 through October 24, 2000 and on December 1, 2000. The borings PRKSB-1-00, PH1-6-00, and US2-1-00 were drilled by Crux Subsurface, Inc. of Spokane, Washington (under contract to WSDOT) using a track-mounted, Morooka MST-1100 drill rig and the triple tube drilling method (HWT Casing with a HQ core). The remaining borings for Section 1 were drilled by Ruen Drilling, Inc. of Clark Fork, Idaho (under contract to WSDOT) with a truck-mounted, Mobile B-61 drill rig advancing hollow-stem augers, or HWT casing for borings DP-5-00, DP-13-00, and US2EB-1-00.

Disturbed samples of the soil encountered in the borings were obtained at frequent intervals using a 2.0-inch, outside-diameter (OD), split-spoon sampler. The sampler was driven into the undisturbed soil ahead of the auger bit with a 140-pound drop hammer falling a distance of approximately 30 inches. The number of blows required to drive the sampler for each six-inch interval of soil penetration, or part thereof, is noted on the boring logs next to the appropriate sampler notation. The number of blows required to drive the sampler the last 12-inches of the 18-inch drive, termed the standard penetration resistance (N), is also noted on the boring logs. Relatively undisturbed samples of fine-grained soil were obtained using a thin-wall Shelby tube advanced ahead of the auger bit with the drill rig's hydraulics. The tubes were extracted from the bore, capped, and tape-sealed for temporary storage.

Standpipe piezometers were installed in all borings with the exception of FARW-3-00, MRK-1-00, PH1-2-00, PH1-3-00, PRK-2-00, PRK-3-00, and US2-1-00, for subsequent measurement of groundwater levels. Details of the piezometer installation are shown on the summary logs in this appendix. The remaining borings were abandoned in accordance with 173-160 WAC.

The field explorations were coordinated and monitored by a geologist from our staff or by a geologist from Yonemitsu Geologic Service (under subcontract to Landau Associates) who maintained detailed records of encountered subsurface soil and groundwater conditions, obtained representative soil samples, and described the soil by visual and textural examination. The exploration locations, shown on Figure 2, were field-located by WSDOT surveyors. Ground surface elevations at the boring locations were determined by WSDOT surveyors. Table A-1 provides a summary of the relevant data regarding the boring locations by stationing and offset, ground surface and casing elevation, and other pertinent data.

All soil encountered in the borings was described using the WSDOT Soil and Rock Classification System, which is a modified version of the Unified Soil Classification System as outlined in ASTM D2488 *Standard Recommended Practice for Description of Soil (Visual-Manual Procedures).*

A key to the classification system and the boring logs is presented on Figure A-1 in this appendix. The boring logs are presented on Figures A-2 through A-27.

TABLE A-1

BORING DATA

Proj. No.	Parcel No.	Property Owner	Bore Hole Point #	Bore Hole ID #	Ground Elev at Bore Hole	Pipe or Cap Elev	Station (ft)	Offset (-)=Lt (+)=Rt	Northing (Proj. Datum)	Easting (Proj. Datum)	Piezometer
1	Market St.	Spokane Co.	BH1000	MRK-1-00	1955.3	N / A	377+90.197	4.43	621982.99	2823021.93	NO
1	6-05415	Kaiser	BH37787	PRKSB-1-00	1932.0	1934.1	386+15.967	-705.62	622307.01	2821982.18	YES
1	6-05413	M.S. Kuney	BH1090	PH1-1-00	1929.6	1929.6	387+66.008	-10.09	622802.83	2822492.51	YES
1	6-05412	J. & G. Hedley	BH37705	PRK-3-00	1927.1	N / A	389+08.952	777.14	623341.22	2823084.37	NO
1	6-05413	M.S. Kuney	BH1091	DP-1-00	1932.0	1932.0	390+93.643	-489.67	622826.54	2821912.18	YES
1	6-05415	Kaiser	BH1089	DP-2-00	1922.4	1922.4	392+71.503	463.25	623482.34	2822626.06	YES
1	6-05413	M.S. Kuney	BH1003	PRK-1-00	1925.8	1925.8	393+64.129	1.00	623315.94	2822184.96	YES
1	6-05415	Kaiser	BH37683	PRK-2-00	1926.1	N / A	396+12.323	1.96	623526.93	2822054.26	NO
1	6-05408	BPA	BH1092	PH1-2-00	1930.2	N / A	403+06.479	-24.14	624101.77	2821664.27	NO
1	6-05408	BPA	BH1093	PH1-3-00	1917.3	N / A	411+83.463	-41.65	624867.67	2821227.18	NO
1	6-05408	BPA	BH1094	PH1-4-00	1907.9	1910.8	421+40.061	2.60	625807.82	2821033.23	YES
1	6-05408	BPA	BH1099	PH1-5-00	1908.8	1912.4	434+15.809	-0.40	627080.84	2820954.32	YES
1	6-05408	BPA	BH1103	PH1-6-00	1941.7	1943.9	443+91.530	69.63	628048.44	2820769.65	YES
1	6-05408	BPA	BH37684	DP-3-00	1900.3	1902.3	447+99.231	549.44	628670.13	2820980.91	YES
1	6-05408	BPA	BH37689	PH1-7-00	1909.2	1911.6	450+49.259	10.66	628593.85	2820385.27	YES
1	6-05408	BPA	BH37694	FARWSB-1-00	1861.0	1863.4	453+97.587	-409.40	628647.73	2819842.25	YES
1	6-05408	BPA	BH37699	DP-4-00	1856.9	1859.5	456+24.718	-648.09	628702.56	2819517.35	YES
1	6-05408	BPA	BH37704	FARW-1-00	1847.5	1848.0	456+98.566	-2.65	629124.71	2820011.15	YES
1	6-05408	BPA	BH37706	FARW-3-00	1850.3	N / A	458+02.055	-169.04	629117.46	2819815.34	NO
1	6-05415	Kaiser	BH37782	DP-12-00	1838.3	1841.3	463+12.649	-1651.84	628711.59	2818300.52	YES
1	6-05420	G.G. Miller	BH37749	US2EB-1-00	1838.9	1838.2	464+45.111	581.72	630070.40	2820078.16	YES
1	6-05428	C.K. Zincgraf	BH37744	PH1-8-00	1836.1	1839.1	465+71.821	10.40	629855.97	2819533.66	YES
1	6-05426	Mead School Dist #354	BH39050	DP-13-00	1840.4	1843.4	466+18.060	-440.05	629642.41	2819134.35	YES
1	6-05429	Miller Family Partnership	BH37754	DP-5-00	1841.2	1844.3	466+68.423	471.15	630196.90	2819859.30	YES
1	US 2	US 2	BH37738	US2-1-00	1837.9	N / A	468+19.826	-122.77	629978.24	2819284.53	NO
1	US 2	US 2	BH37739	US2-2-00	1838.1	1841.2	468+26.879	146.51	630147.57	2819494.03	YES

Washington State Department of Transportation

Test Boring Legend

Sampler Symbols

	Standard Penetration Test
	Oversized Penetration Test (Dames & Moore, California)
	Shelby Tube
P	Piston Sample
	Washington Undisturbed
	Becker Hammer
	Core
G	Grab Sample
B	Bag Sample

Well Symbols

	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Bottom Seal
	Inclinometer Casing in Concrete Bentonite Grout

Laboratory Testing Codes

UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
UC	Unconfined Compression Test
DS	Direct Shear Test
CN	Consolidation Test
GS	Grain Size Distribution
MC	Moisture Content
SG	Specific Gravity
OR	Organic Content
DN	Density
AL	Atterberg Limits
PT	Point Load Compressive Test
SL	Slake Test
DG	Degradation
LA	LA Abrasion

Soil Density Modifiers

Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

Angularity of Gravel & Cobbles

Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers

Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure

Stratified	Alternating layers of varying material or color at least 6mm thick; note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 6mm thick; note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, sometimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCL Reaction

No HCL Reaction	No visible reaction.
Weak HCL Reaction	Some reaction with bubbles forming slowly.
Strong HCL Reaction	Violent reaction with bubbles forming immediately.

Degree of Vesicularity of Pyroclastic Rocks

Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

Figure A-1

Washington State
Department of Transportation

Test Boring Legend

Grain Size

Fine Grained	< 1mm	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	1mm to 5mm	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	> 5mm	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength

Grade	Description	Field Identification	Uniaxial Compressive Strength approx
R1	Very Weak	Specimen crumbles under sharp blow from point of geological hammer, and can be cut with a pocket knife.	1 to 25 MPa
R2	Moderately Weak	Shallow cuts or scrapes can be made in a specimen with a pocket knife. Geological hammer point indents deeply with firm blow.	25 to 50 MPa
R3	Moderately Strong	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer.	50 to 100 MPa
R4	Strong	Specimen breaks with one firm blow from the hammer end of a geological hammer.	100 to 200 MPa
R5	Very Strong	Specimen requires many blows of a geological hammer to break intact sample.	Greater than 200 MPa

Discontinuities

Spacing	
Very Widely	Greater than 3 m
Widely	1 m to 3 m
Moderately	0.3 m to 1 m
Closely	50 mm to 300 mm
Very Closely	Less than 50 mm

RQD (%)

$$\frac{100(\text{length of core in pieces} > 100\text{mm})}{\text{Length of core run}}$$

Condition	
Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 1 mm, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 1 mm, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 5 mm thick, or open discontinuities 1 to 5 mm.
Very Poor	Soft gouge greater than 5 mm thick, or open discontinuities greater than 5 mm.

Fracture Frequency (FF) is the average number of fractures per 300 mm of core.
Does not include mechanical breaks caused by drilling or handling.

Figure A-1

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **MRK-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **377+90.197** Offset **4.43** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1955.3 (595.98 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 24, 2000** Completion Date **October 24, 2000** Sheet **1** of **3**

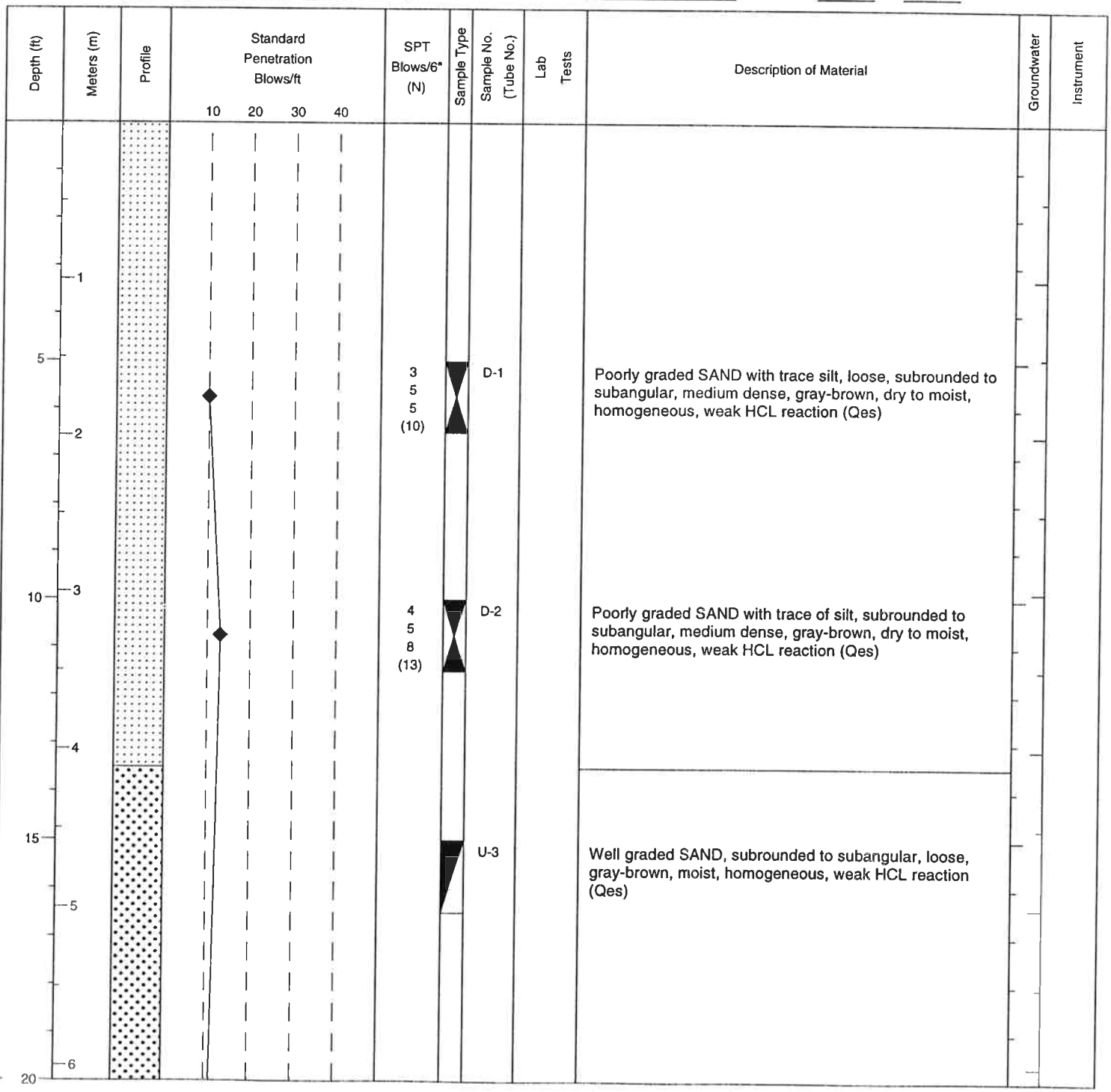

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Figure A-2 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **MRK-1-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

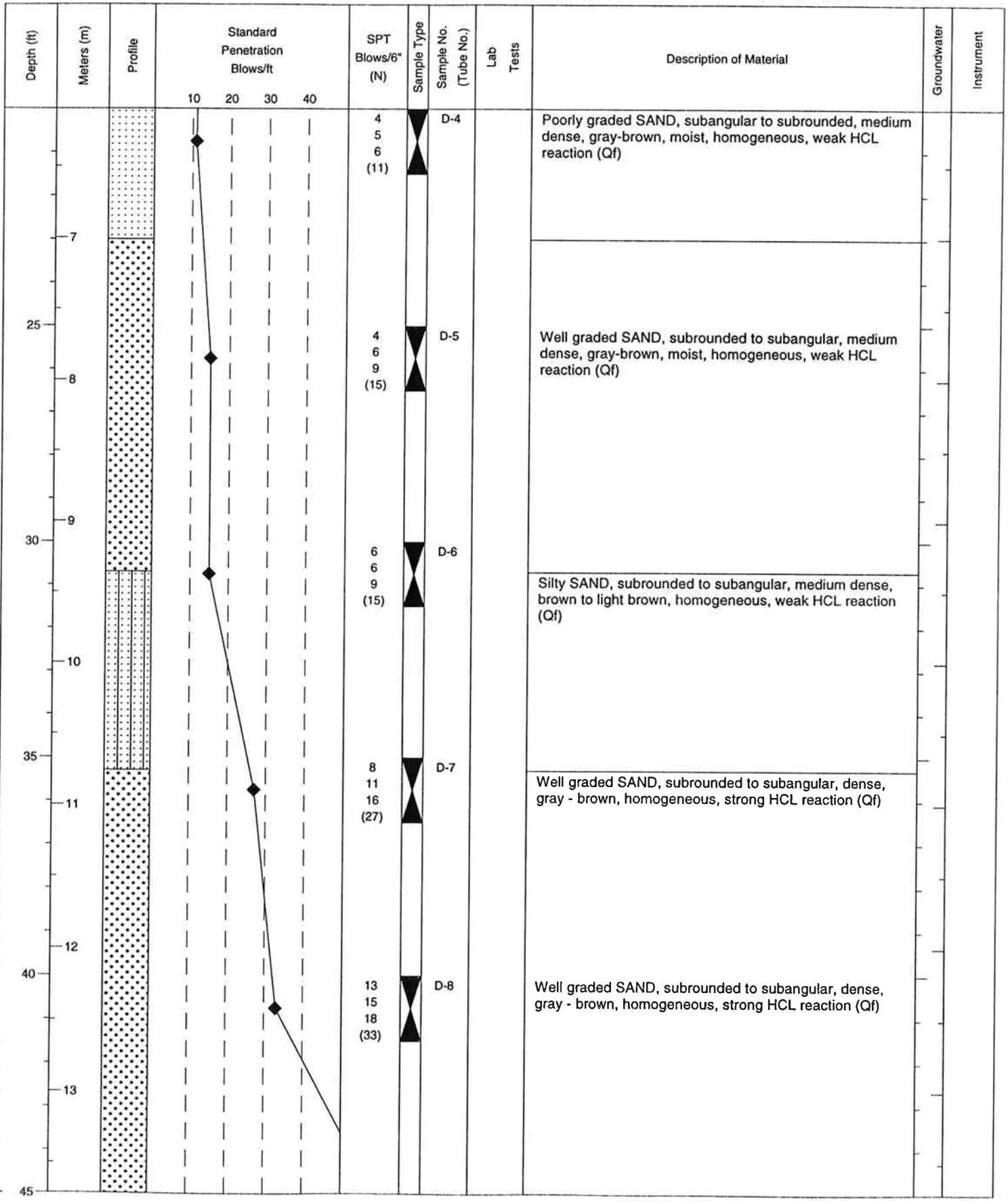

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Figure A-2 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **MRK-1-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	14		>>	18 29 34 (63)		D-9		Well graded SAND, subrounded to subangular, very dense, gray - brown, homogeneous, strong HCL reaction (Qf)		
	15									
50			>>	22 25 28 (53)		D-10		Well graded SAND, subrounded to subangular, very dense, gray - brown, homogeneous, strong HCL reaction (Qf)		
	16									
55	17									
	18									
60										
	19									
65	20									
	21									
70										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:00:28 A2

Figure A-2 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRKSB-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **386+15.967** Offset **-705.62** C.S.

Equipment **Morooka MST-1100** Casing **HWT/HQ** Ground El **1932.0 (588.87 m)**

Method of Boring **HQ casing advance**

Start Date **September 26, 2000** Completion Date **September 27, 2000** Sheet **1** of **2**

Depth (ft)	Meters (m)	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Description of Material
5	1		4 4 5 (9)		D-1	Poorly graded fine to medium SAND, subrounded to subangular, loose, moist, homogeneous, weak HCL reaction (Qes)
10	3		7 7 8 (15)		D-2	Well graded SAND, subrounded to subangular, medium dense, grayish brown, moist, homogeneous, weak HCL reaction (Qf)
15	5		8 8 10 (18)		D-3	Well graded SAND with trace of fine gravel, subrounded to subangular, medium dense, grayish brown, moist, homogeneous, weak HCL reaction (Qf)
20	6		6		D-4	Well graded SAND, subrounded to subangular, medium

Groundwater | Instrument

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Figure A-3 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRKSB-1-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

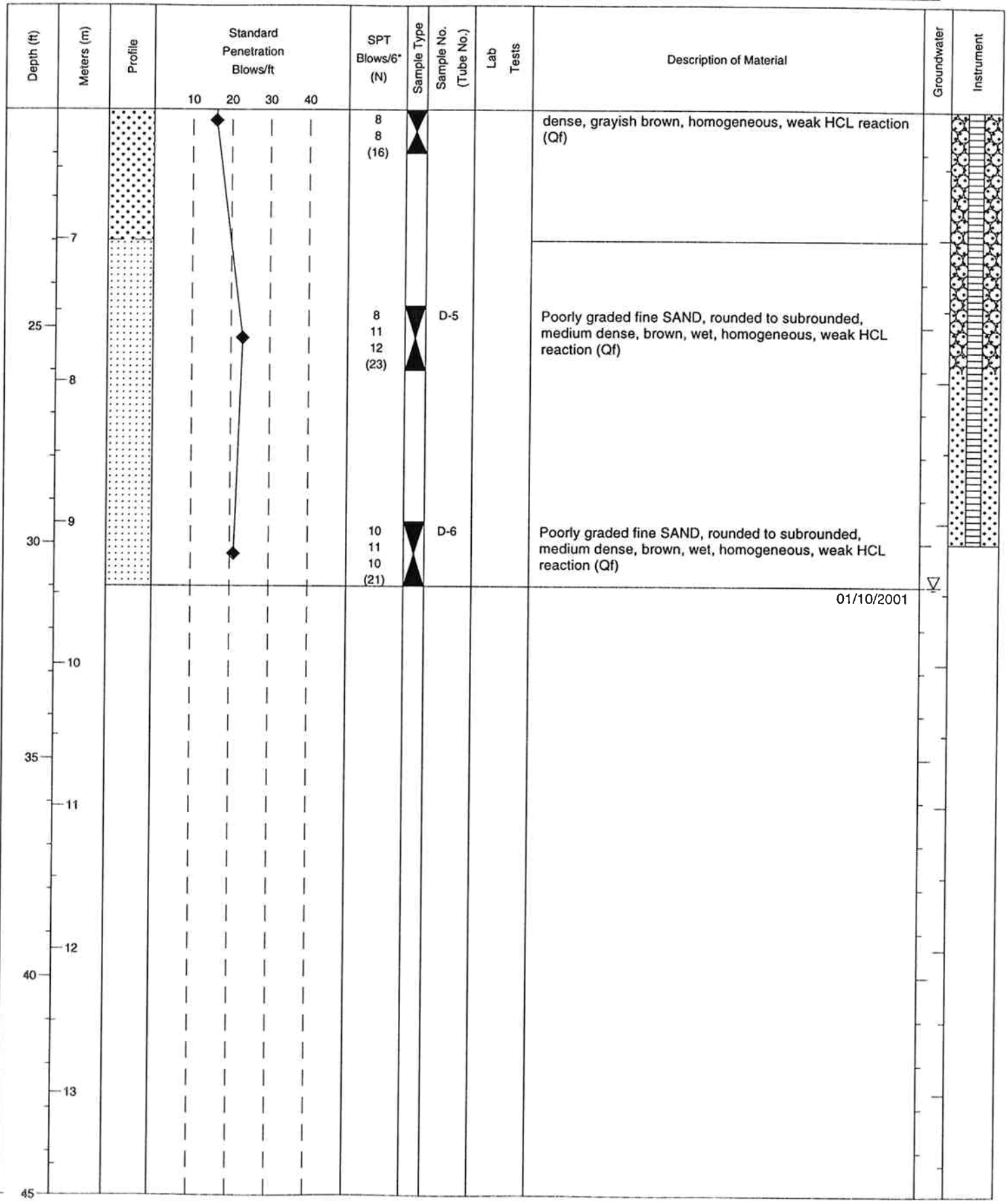

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Figure A-3 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

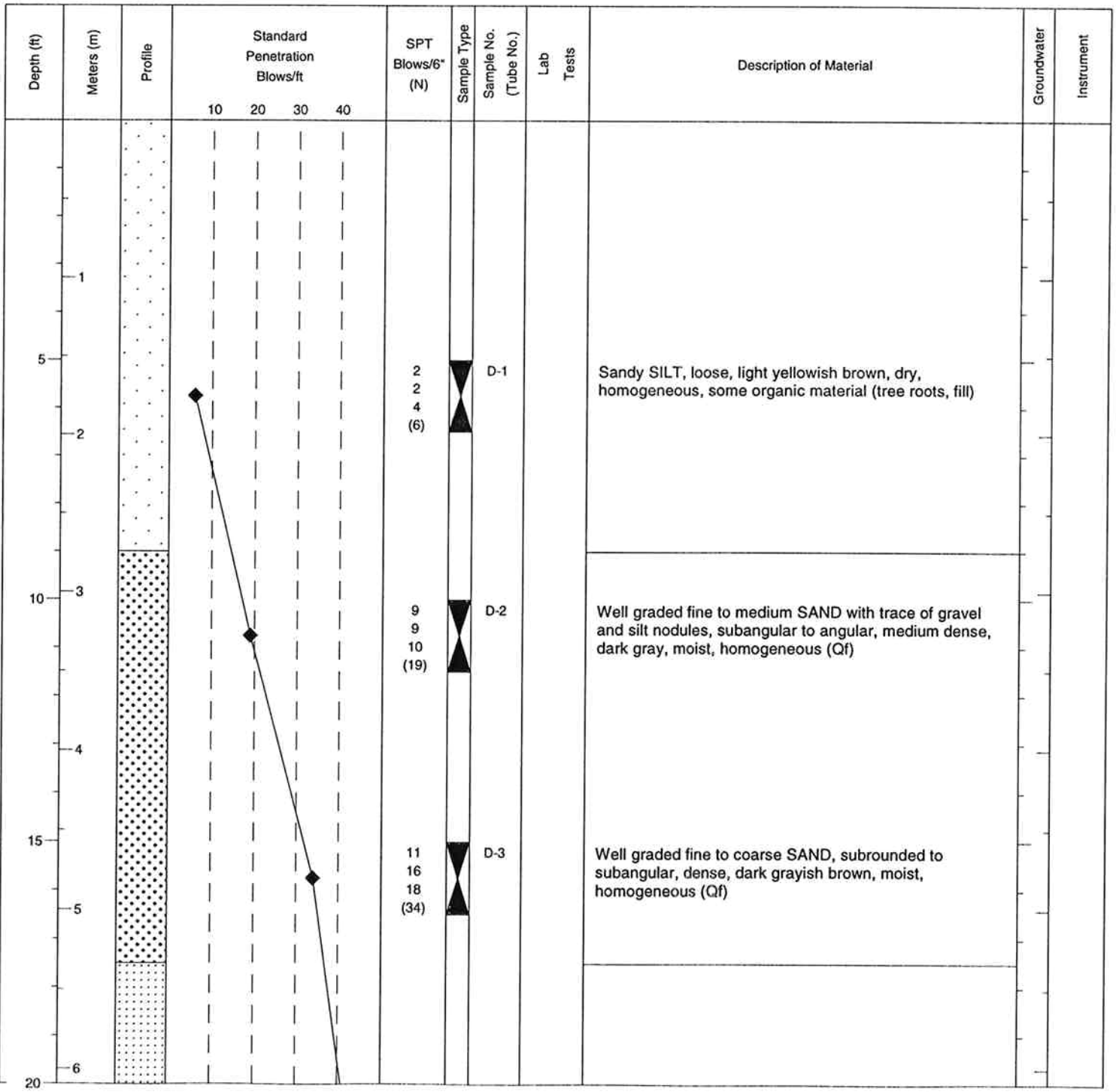
Spokane, Washington S.R. **395**

Station **387+66.008** Offset **-10.09** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1929.6 (588.14 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 26, 2000** Completion Date **September 26, 2000** Sheet **1** of **3**



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LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-1-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				9 18 24 (42)		D-4		Poorly graded fine to medium SAND with silt, subangular to subrounded, dense, dark grayish brown, moist, homogeneous (Qf)		
25	7 8			16 16 15 (31)		D-5		Poorly graded SAND subrounded to subangular, dense, dark brown, moist, homogeneous (Qf)		
30	9 10			14 14 18 (32)		D-6		Poorly graded SAND, subangular to angular, dense, dark brown, moist, homogeneous (Qf)		
35	11 12			11 15 19 (34)		D-7		Poorly graded SAND, subangular to angular, dense, dark brown, moist, homogeneous (Qf)		
40	13			9 11 13 (24)		D-8		Poorly graded SAND, subrounded to subangular, medium dense, brown, moist, homogeneous (Qf)		
45										

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Figure A-4 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-1-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	14			10 14 16 (30)		D-9		Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous (Qf)		
	15									
50				11 16 18 (34)		D-10		Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous (Qf)		
	16									
55	17									
	18									
60										
	19									
65	20									
	21									
70										

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Figure A-4 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-3-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **389+08.952** Offset **777.14** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1927.1 (587.38 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 24, 2000** Completion Date **October 24, 2000** Sheet **1** of **3**

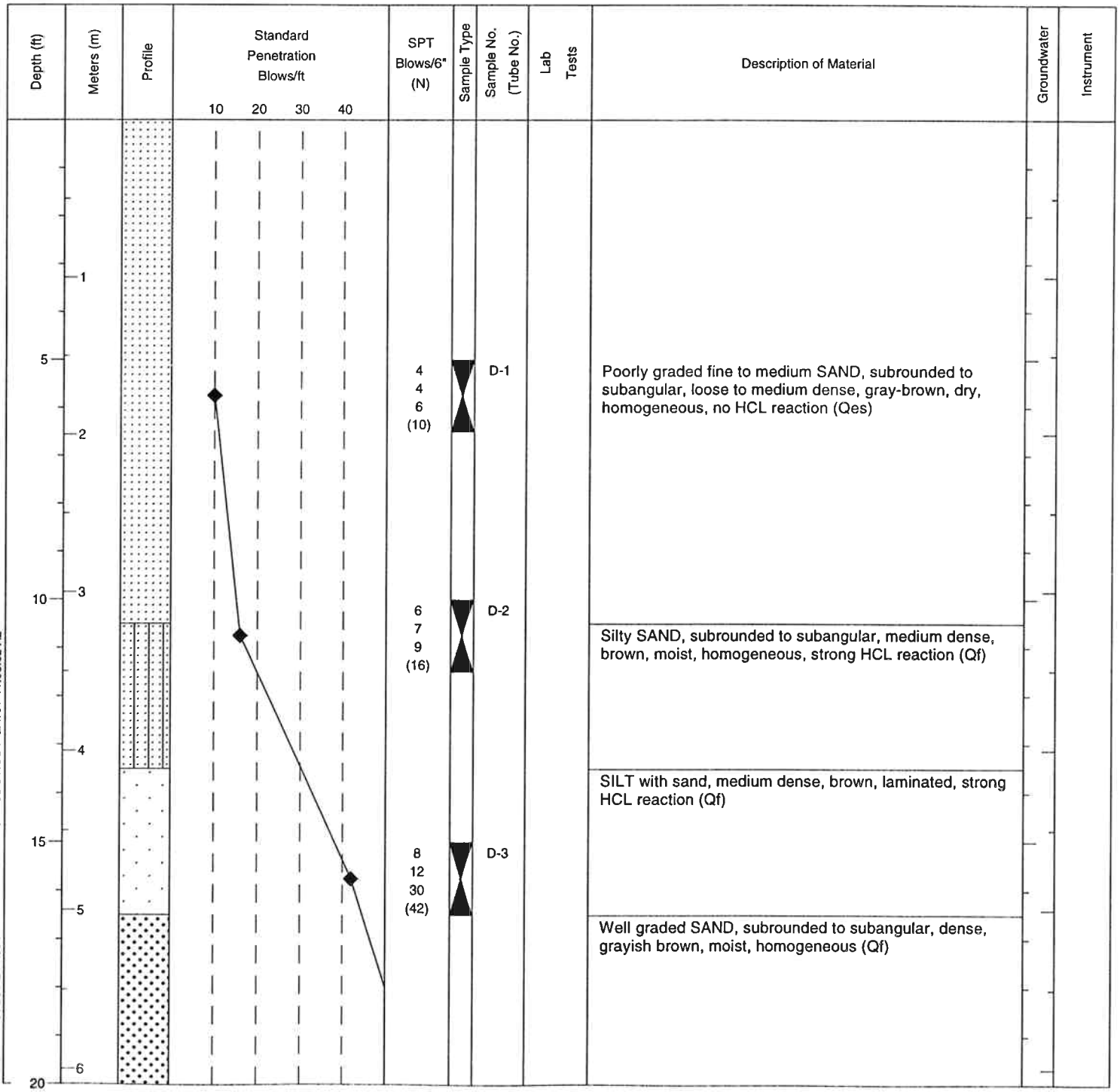

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Figure A-5 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-3-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Sheet **2** of **3**

Job No. **XL1154**

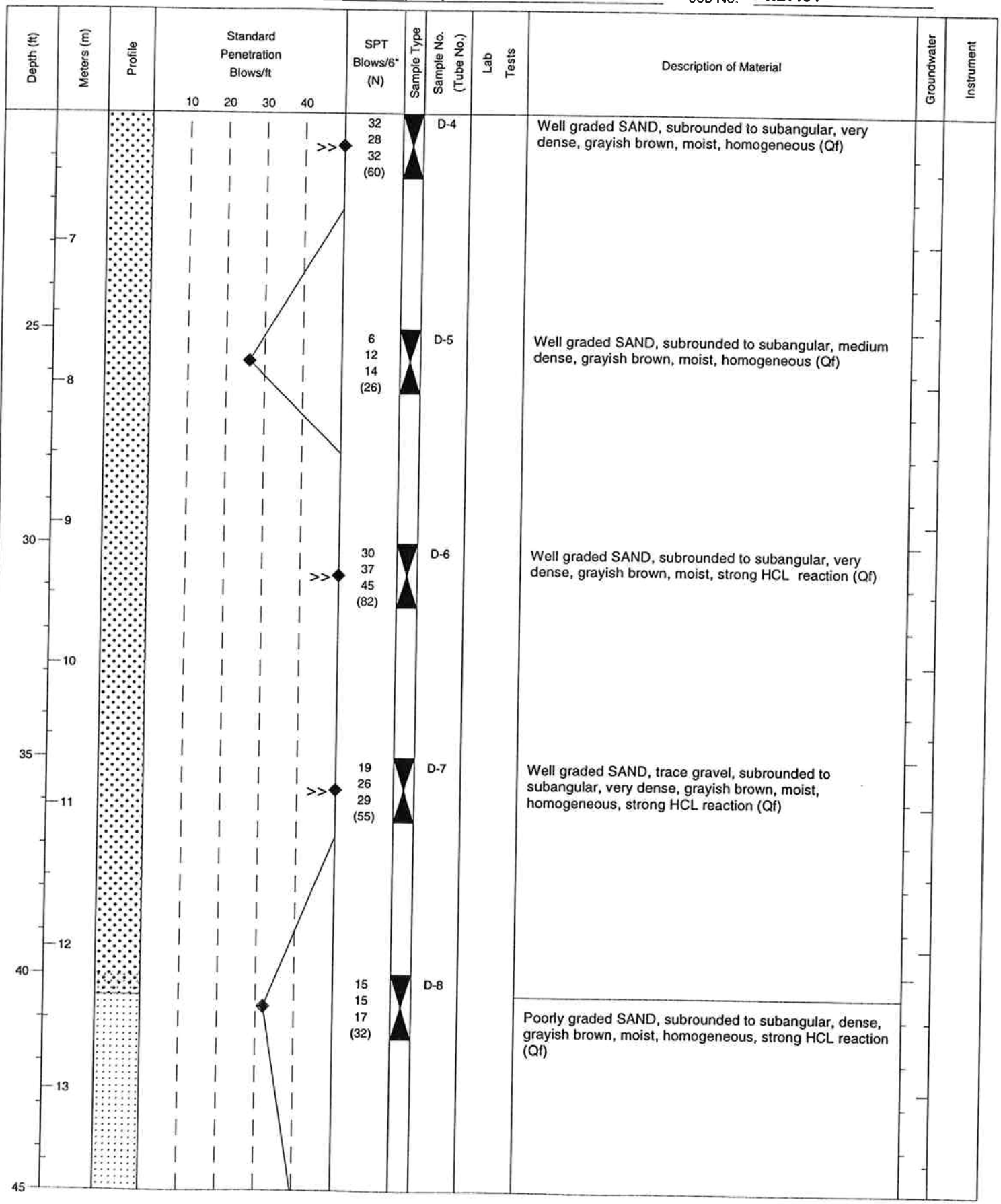

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Figure A-5 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-3-00**

Sheet 3 of 3

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				17 17 24 (41)		D-9		Poorly graded SAND, subrounded to subangular, dense, moist, grayish brown, homogeneous, strong HCL reaction (Qf)		
50	15			17 18 22 (40)		D-10		Poorly graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
55	17									
60	18									
65	19									
70	20									
	21									

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Figure A-5 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **390+93.643** Offset **-489.67** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1932.0 (588.87 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 27, 2000** Completion Date **September 27, 2000** Sheet **1** of **2**

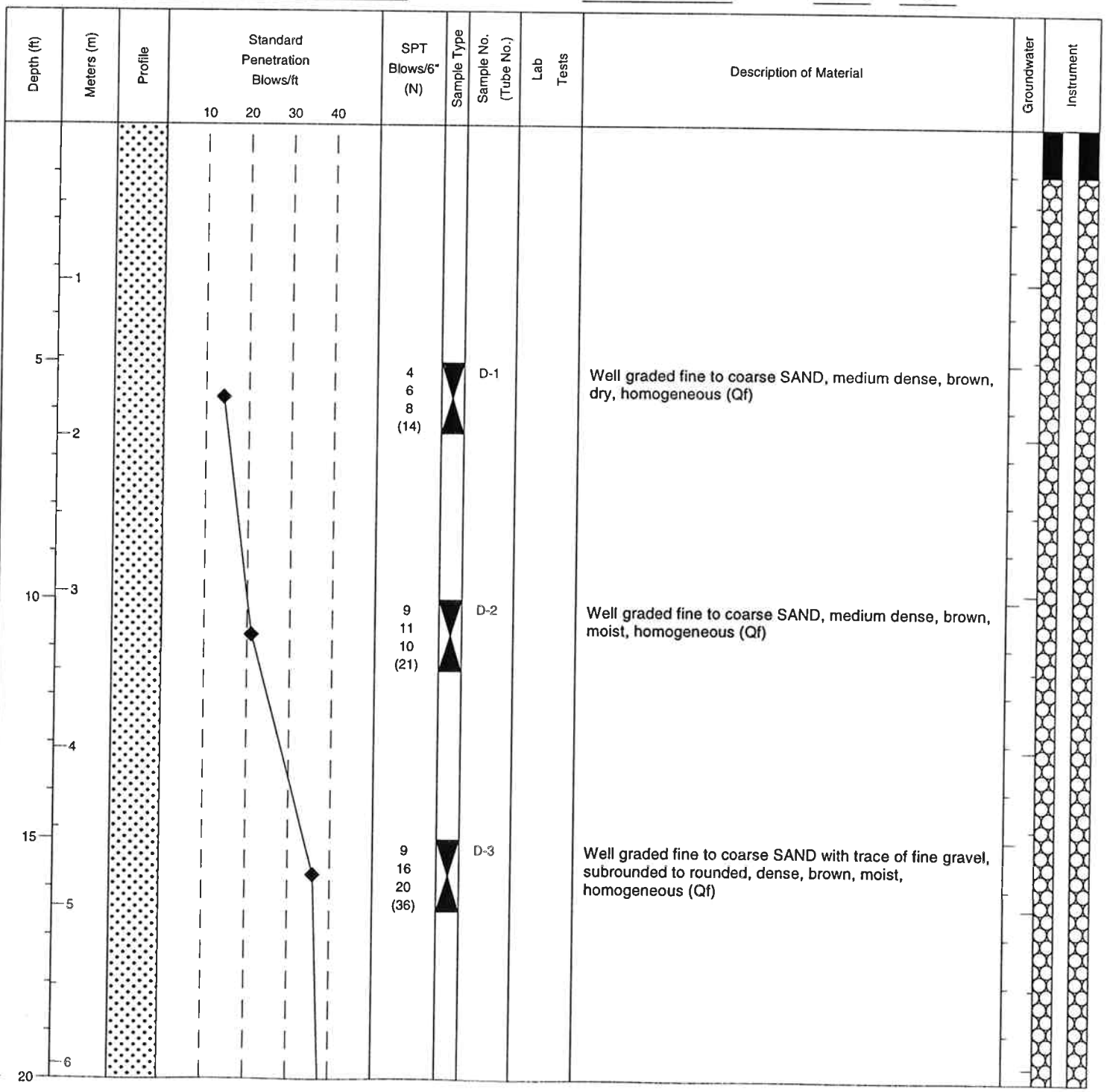

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Figure A-6 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 1-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				15 19 19 (38)		D-4		Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
25	7			15 15 15 (30)		D-6	GS MC = 4	Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
30	8 9			13 15 17 (32)		D-7		Poorly graded fine to medium SAND, subrounded to rounded, dense, brown, moist, homogeneous (Qf)		
35	10 11									
40	12 13									
45										

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Figure A-6 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 2-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **392+71.503** Offset **463.25** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1922.4 (585.95 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 26, 2000** Completion Date **September 26, 2000** Sheet **1** of **2**

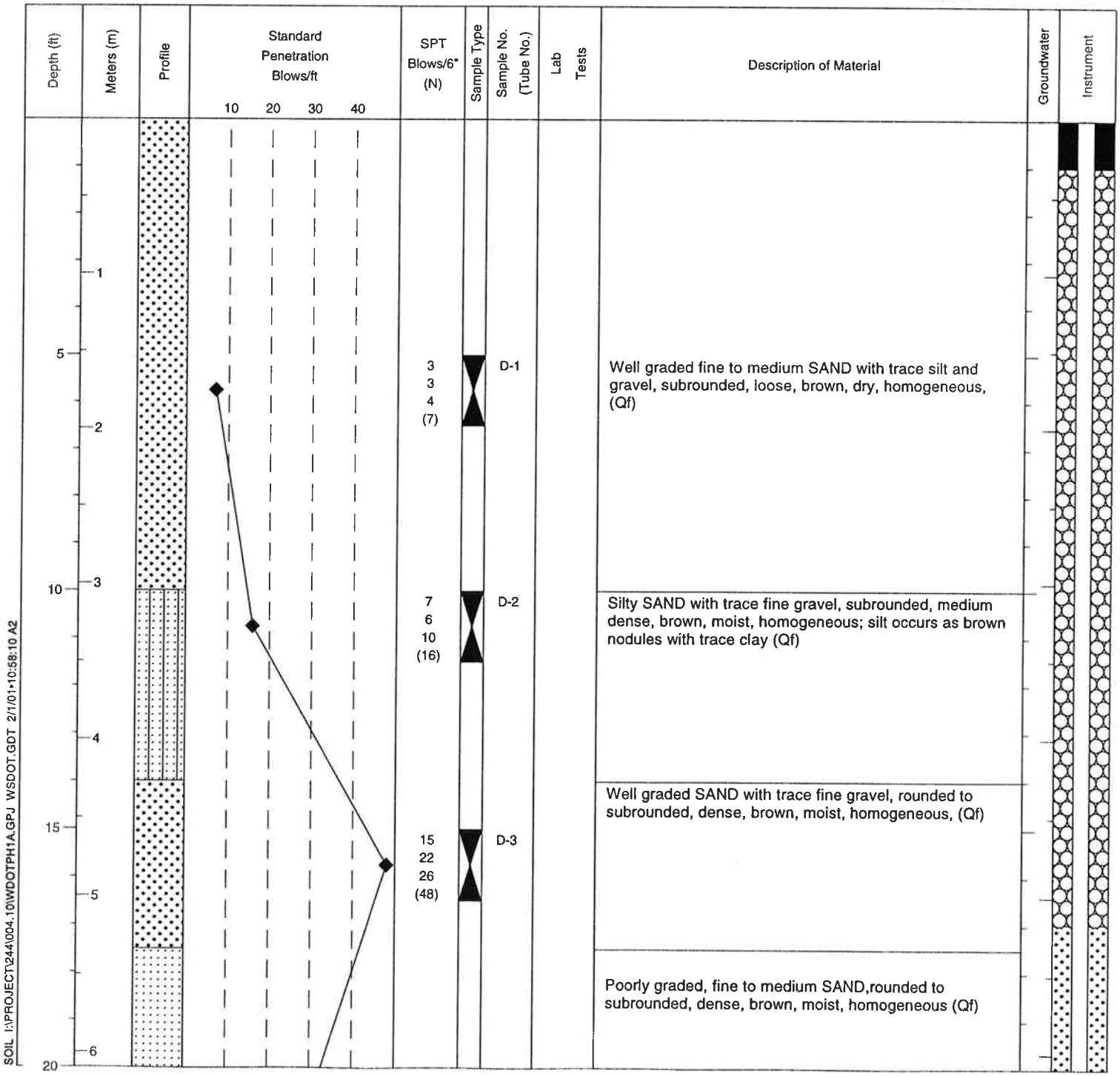

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Figure A-7 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. DP- 2-00

Sheet 2 of 2

PROJECT WSDOT SR395 North Spokane Corridor Project

Job No. XL1154

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				12 14 16 (30)		D-4		Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)		
25	7			18 21 23 (44)		D-5	GS MC = 2	Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)		
30	9			14 14 16 (30)		D-6		Poorly graded, fine to medium SAND,rounded to subrounded, dense, brown, moist, homogeneous (Qf)		
35	10									
40	11									
45	12									
	13									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•10:58:11 A2

Figure A-7 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **393+64.129** Offset **1.00** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1925.8 (586.98 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 27, 2000** Completion Date **September 27, 2000** Sheet **1** of **3**

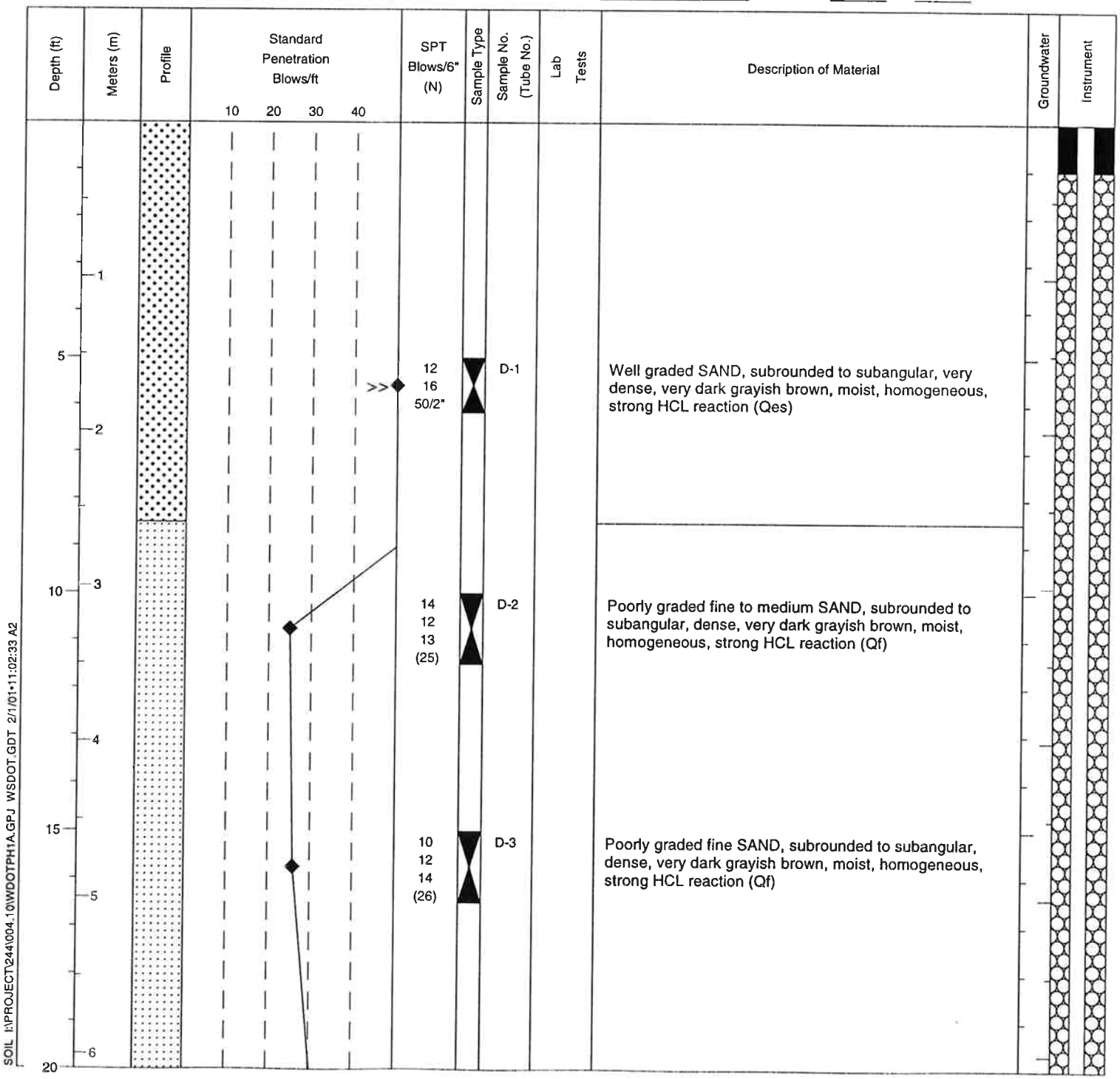

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Figure A-8 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-1-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

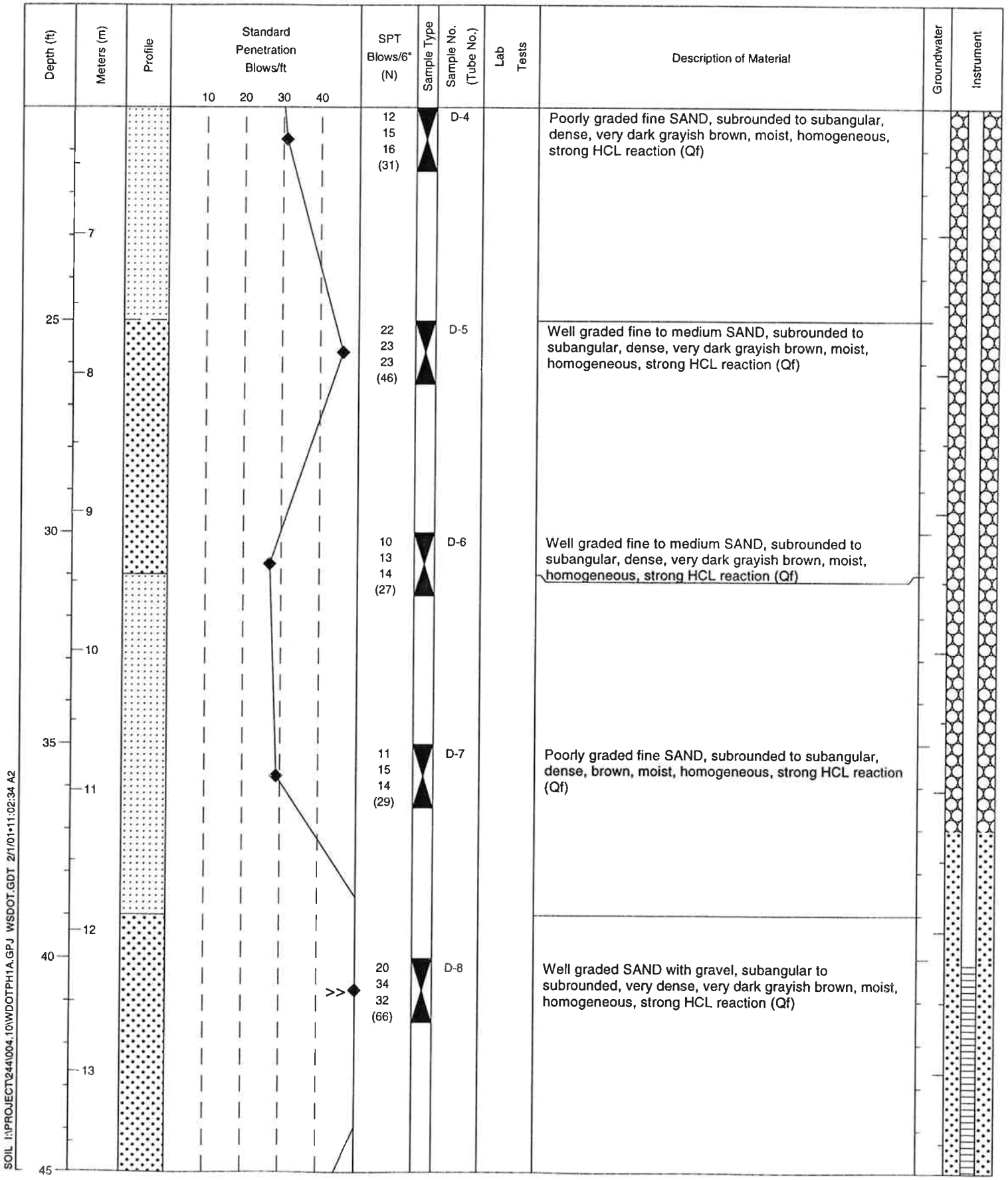

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Figure A-8 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-1-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
50	14			15 19 22 (41)		D-9		Well graded SAND with trace of gravel, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
	15									
50				10 19 24 (43)		D-10		Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
	16									
55	17									
	18									
60	19									
65	20									
	21									
70										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:02:35 A2

Figure A-8 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-2-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

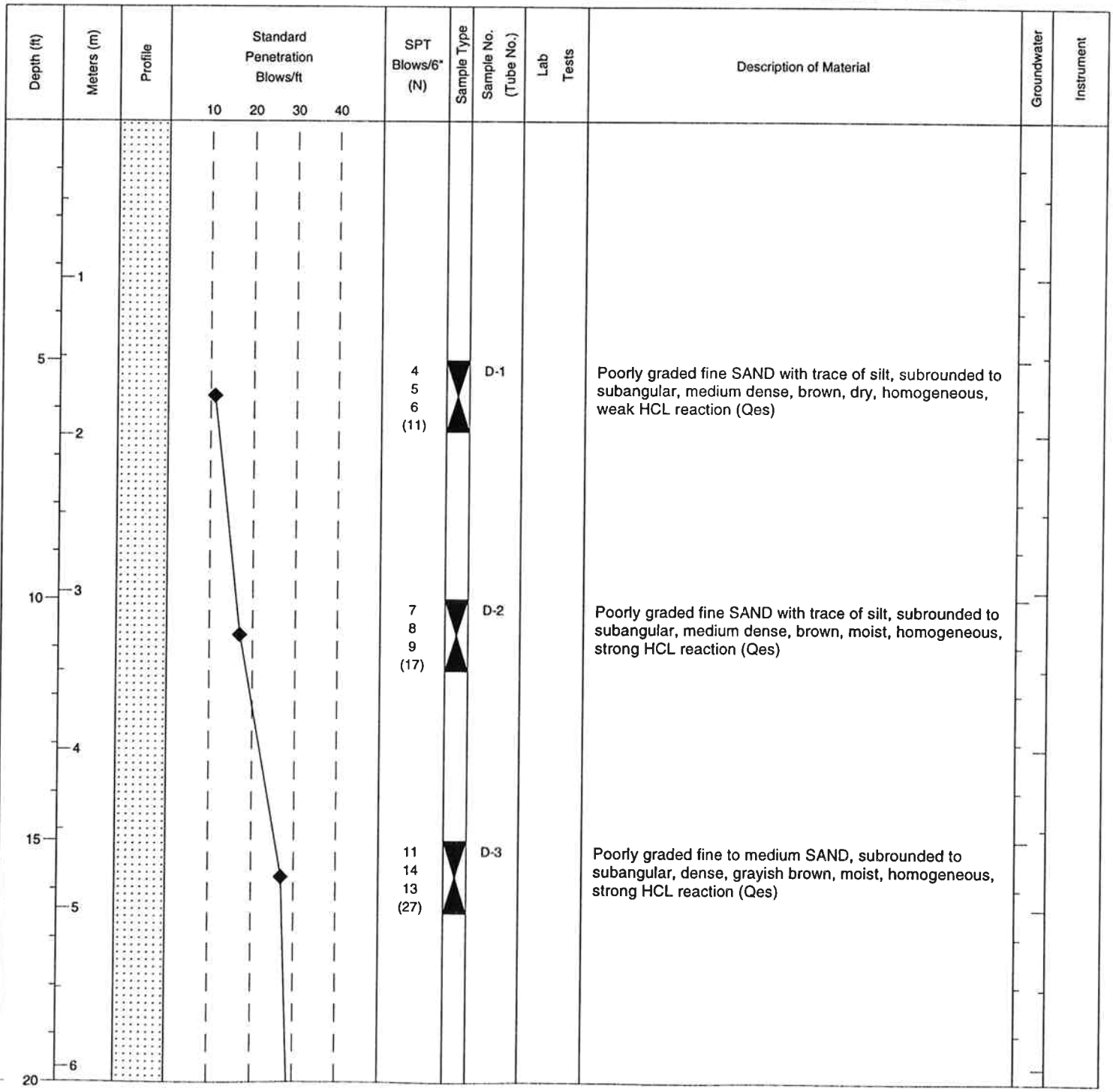
Spokane, Washington S.R. **395**

Station **396+12.323** Offset **1.96** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1926.1 (587.08 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 28, 2000** Completion Date **September 28, 2000** Sheet **1** of **3**



SOIL I:\PROJECT\2441004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:02:48 A2

Figure A-9 Page (1 of 3)

LOG OF TEST BORING

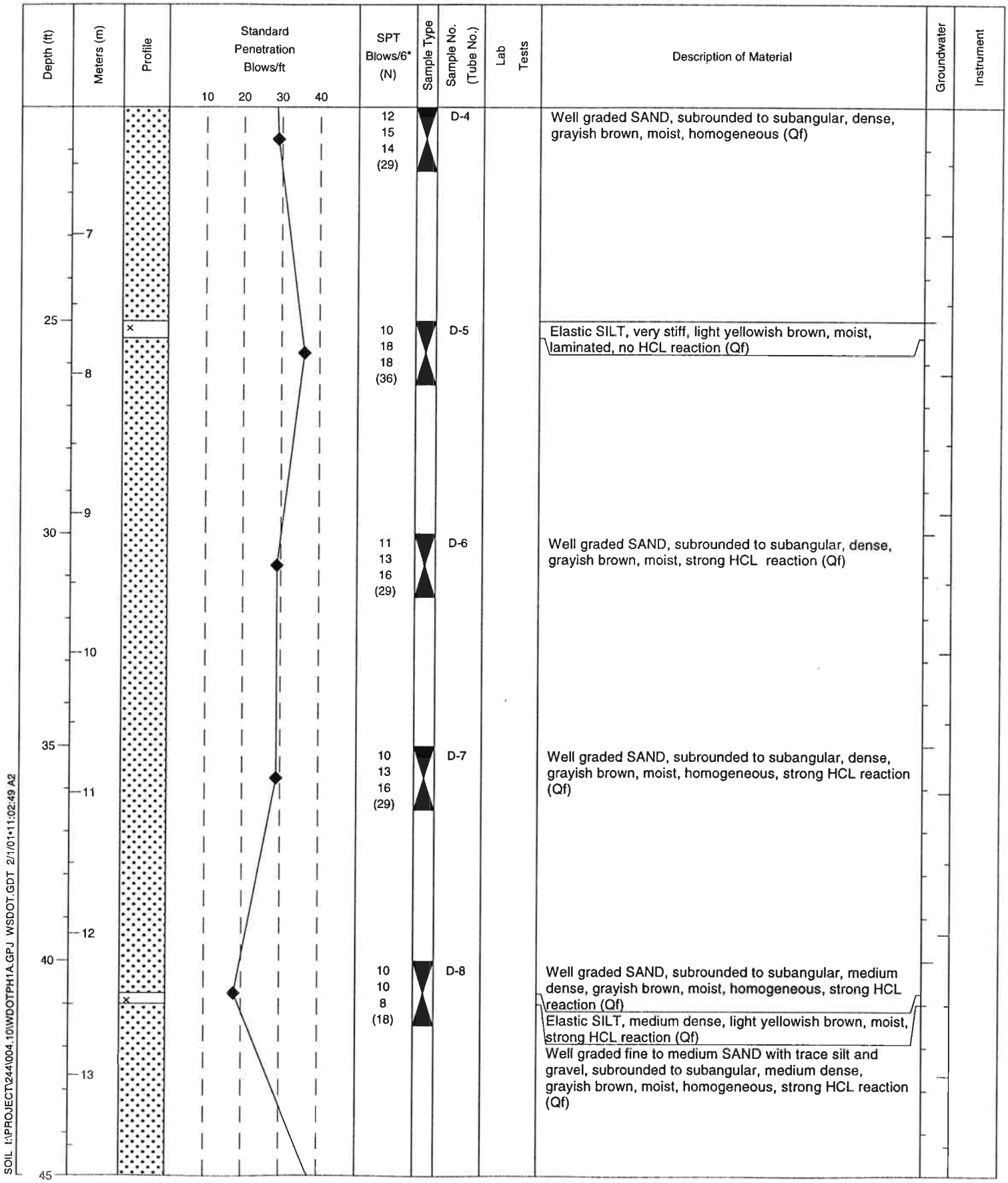
Washington State Department of Transportation

HOLE No. **PRK-2-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**



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LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PRK-2-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

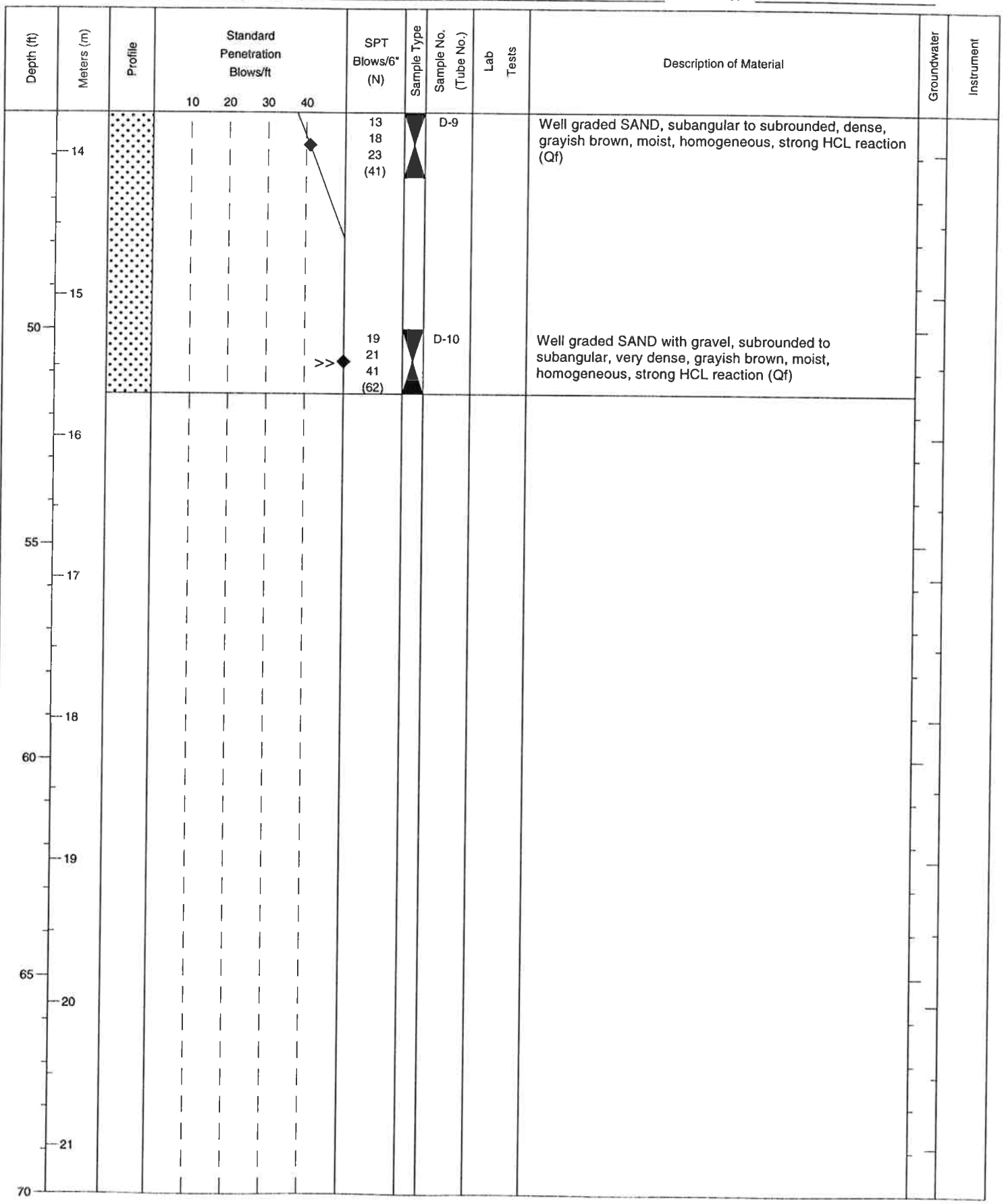

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Figure A-9 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-2-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **403+06.479** Offset **-24.14** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1930.2 (588.32 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 28, 2000** Completion Date **September 28, 2000** Sheet **1** of **2**

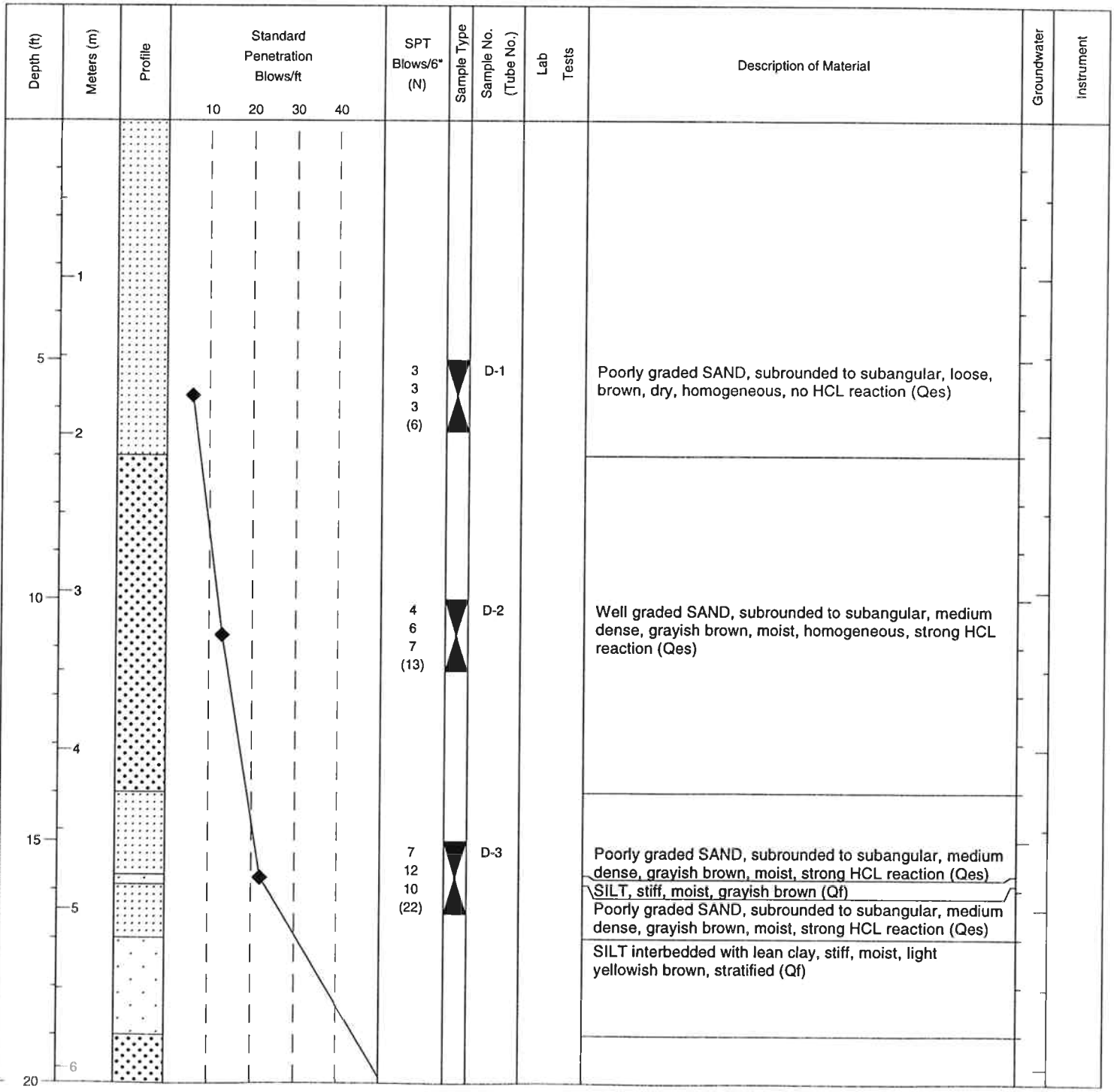

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Figure A-10 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-2-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			>>	19 28 28 (56)		D-4		Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
25	7		>>	5 14 50/4"		D-5		SILT, hard, light yellowish brown, wet, homogeneous, no HCL reaction (Qf)		
	8							Elastic SILT (Qf)		
30	9			11 17 24 (40)		D-6		Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
35	10									
	11									
40	12									
	13									
45										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:00:52 A2

Figure A-10 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-3-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

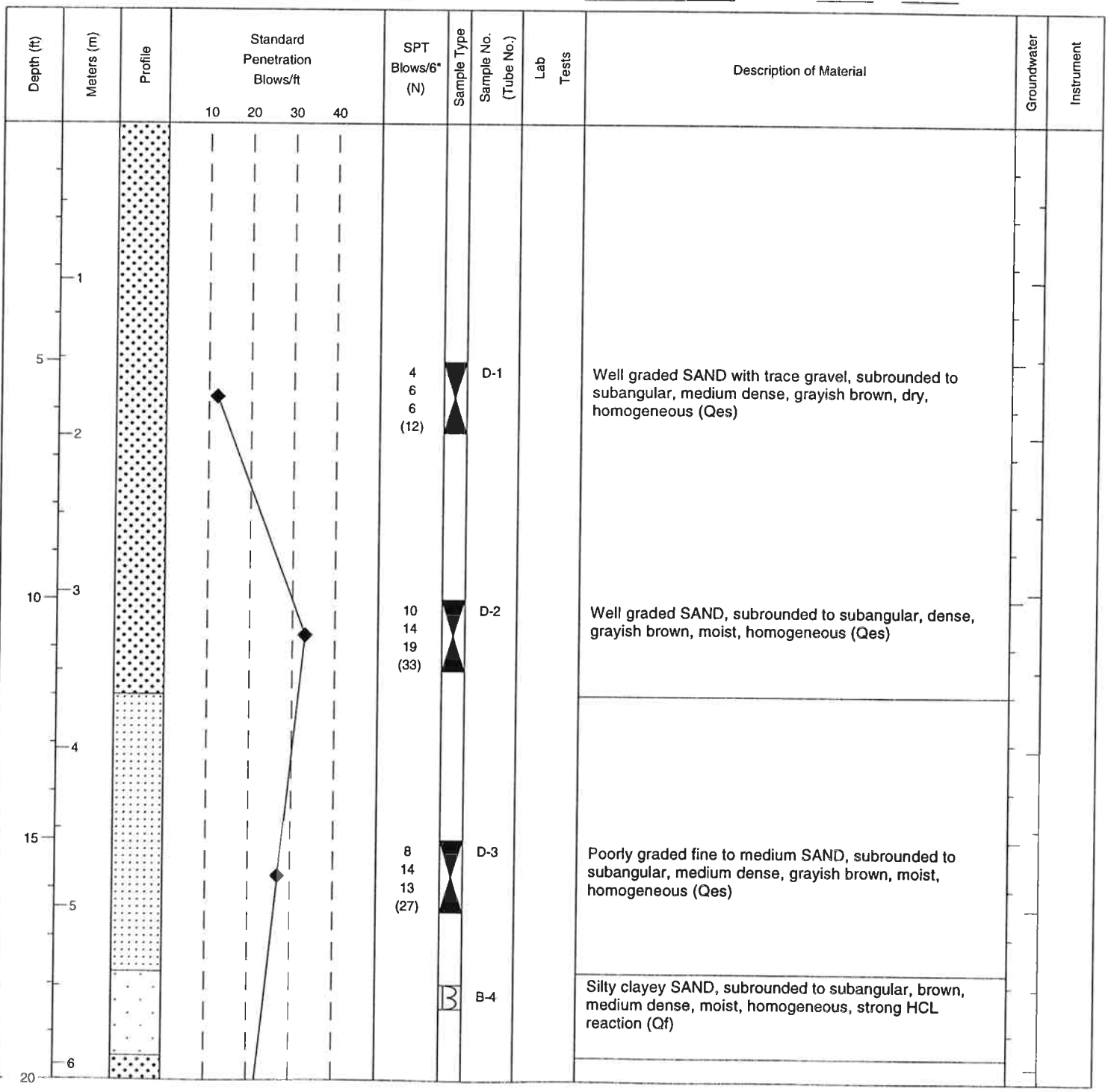
Spokane, Washington S.R. **395**

Station **411+83.463** Offset **-41.65** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1917.3 (584.39 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 28, 2000** Completion Date **September 28, 2000** Sheet **1** of **2**



SOIL I:\PROJECT\244004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:01:01 A2

Figure A-11 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-3-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				8 10 11 (21)		D-5		Well graded SAND, subrounded to subangular, medium dense, grayish brown, moist, homogeneous (Qf)		
25	7			11 11 13 (24)		D-6		Well graded SAND, rounded to subrounded, medium dense, grayish brown, moist, homogeneous (Qf)		
30	8 9			10 13 18 (31)		D-7		Well graded SAND, subrounded to subangular, dense, grayish brown, moist, homogeneous (Qf)		
35	10 11									
40	12									
45	13									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:01:02 A2

Figure A-11 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-4-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **421+40.061** Offset **2.60** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1907.9 (581.53 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 29, 2000** Completion Date **September 29, 2000** Sheet **1** of **2**

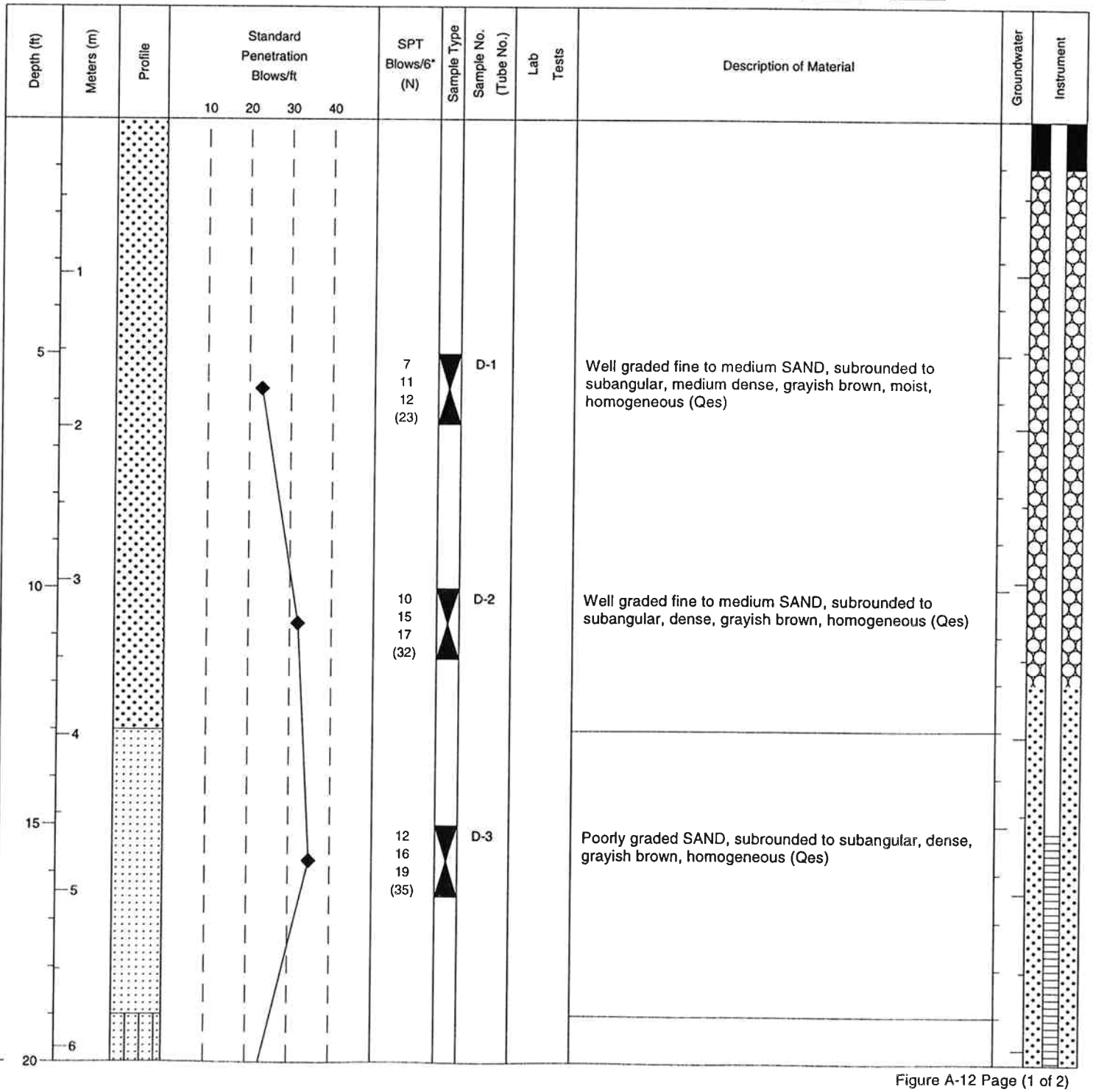


Figure A-12 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-4-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				11 13 8 (21)		D-4	MC = 27 AL	Silty SAND, subrounded to subangular, medium dense, brown, moist, homogeneous (Qf)		
								Lean CLAY very stiff, light yellowish brown, moist, fining upward (Qf)		
25	7			48 30 40 (70)		D-5				
	8		>>					Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous (Qf)		
30	9									
	10									
35	11									
40	12									
	13									
45										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:01:12 A2

Figure A-12 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-5-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **434+15.809** Offset **-0.40** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1908.8 (581.80 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **September 29, 2000** Completion Date **September 29, 2000** Sheet **1** of **2**

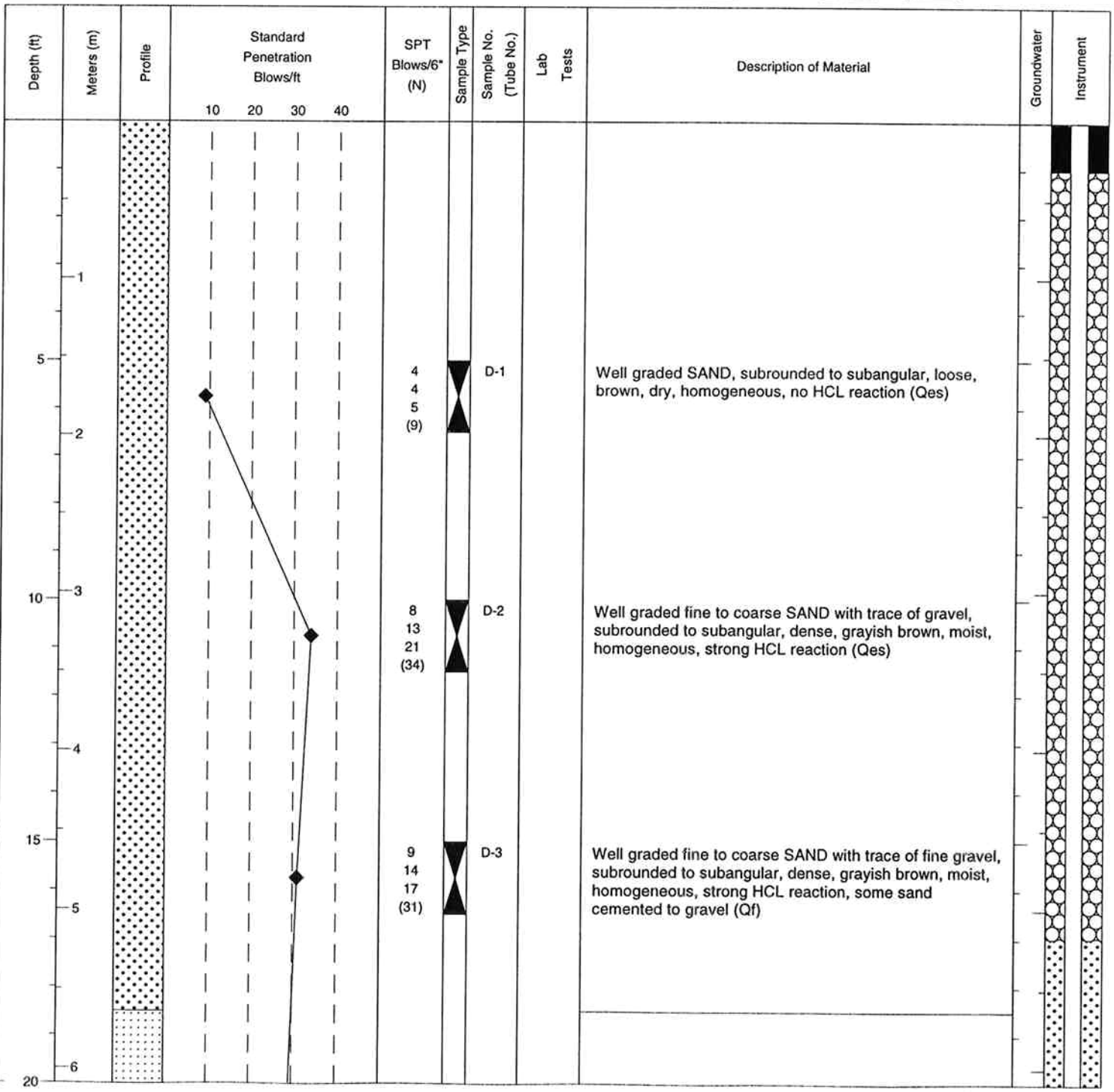


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Figure A-13 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-5-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

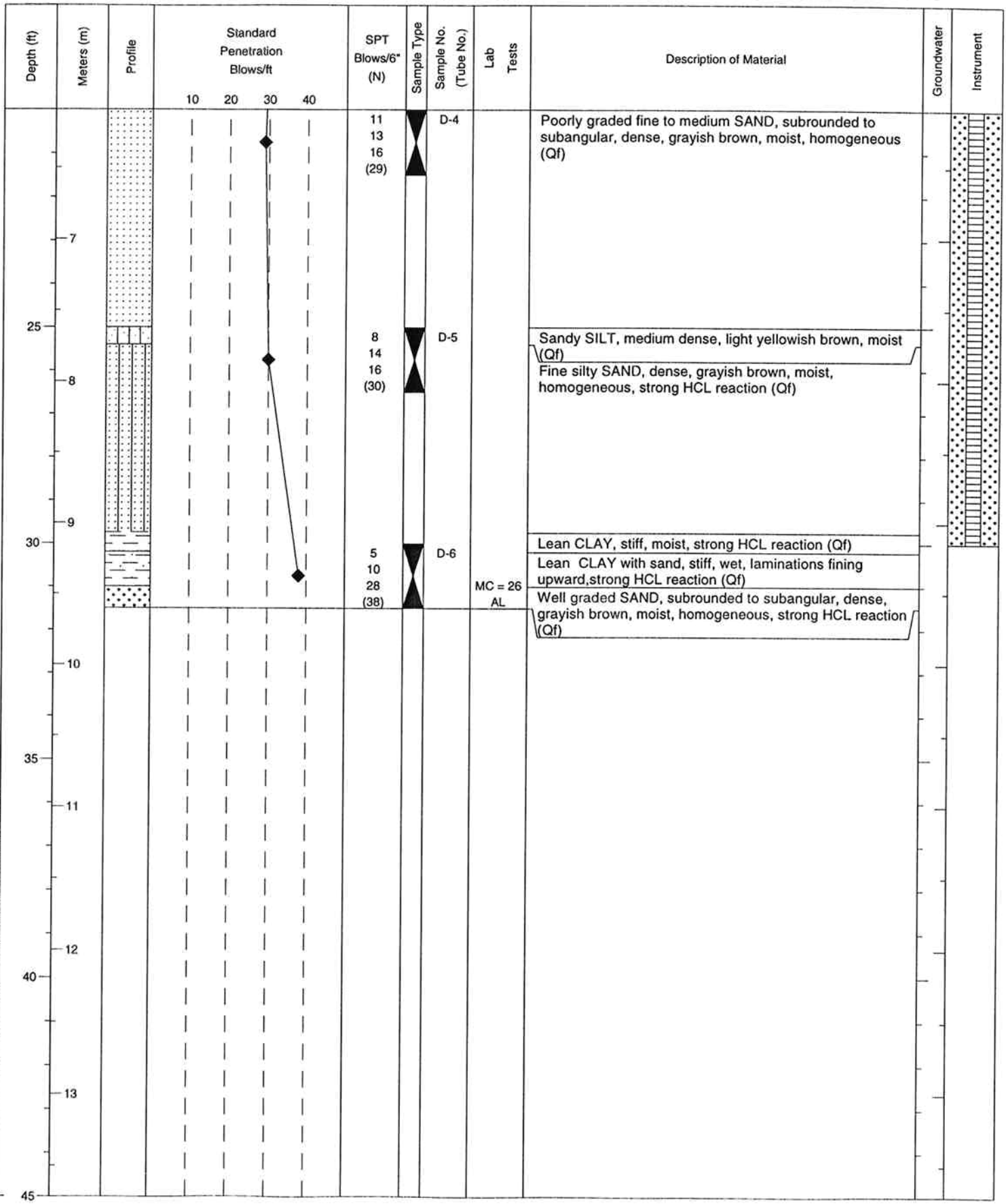

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Figure A-13 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-6-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **443+91.530** Offset **69.63** C.S.

Equipment **Morooka MST-1100** Casing **HWT/HQ** Ground El **1941.7 (591.83 m)**

Method of Boring **HQ casing advance**

Start Date **October 4, 2000** Completion Date **October 5, 2000** Sheet **1** of **5**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								Poorly graded fine to medium SAND, subrounded to subangular, loose, grayish brown, homogeneous (Qes)		
5	1			3 2 4 (6)		D-1		Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
10	2 3			3 2 3 (5)		D-2		Poorly graded fine to medium SAND, subrounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
15	4 5			2 2 2 (4)		D-3		Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
20	6			3 3 2		D-4		Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous,		

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:04:44 P2

Figure A-14 Page (1 of 5)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-6-00**

Sheet **2** of **5**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			(5)				weak HCL reaction (Qes)		
	7								
			3 3 3 (6)		D-5		Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
25									
	8								
			3 3 3 (6)		D-6		Poorly graded fine to medium SAND, rounded to subangular, loose, wet, homogeneous, weak HCL reaction (Qes)		
	9								
30									
	10								
			3 3 5 (8)		D-7		Poorly graded fine to medium SAND, rounded to subangular, loose, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
35									
	11								
			4 5 6 (11)		D-8		Poorly graded fine to medium SAND, rounded to subangular, medium dense, grayish brown, wet, homogeneous, weak HCL reaction (Qes)		
	12								
40									
	13								
			9 11 12		D-9		Poorly graded medium to coarse SAND, rounded to subangular, medium dense, grayish brown, wet, weak		
45									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:04:45 P2

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-6-00**

Sheet 3 of 5

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

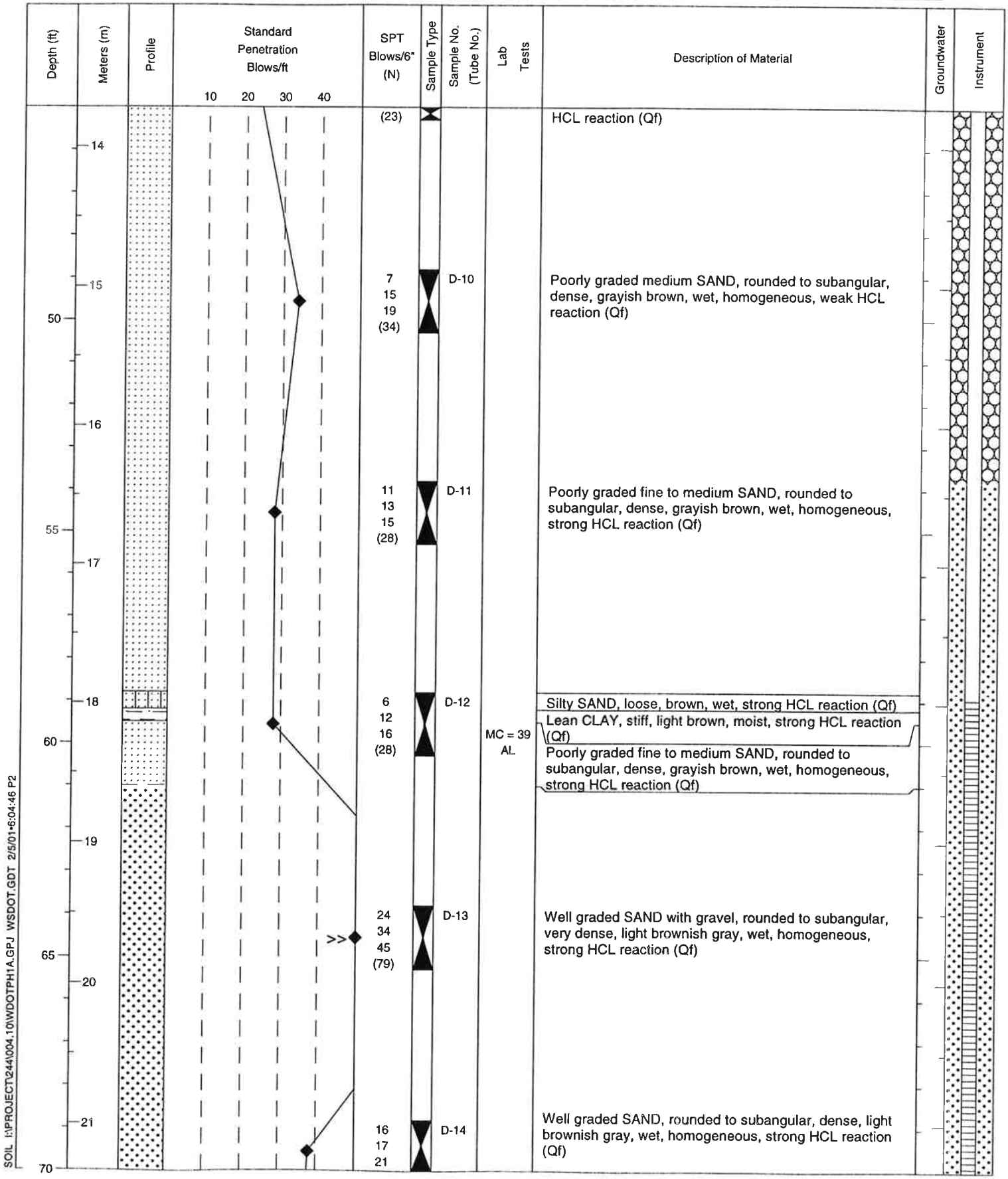

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Figure A-14 Page (3 of 5)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-6-00**

Sheet **4** of **5**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

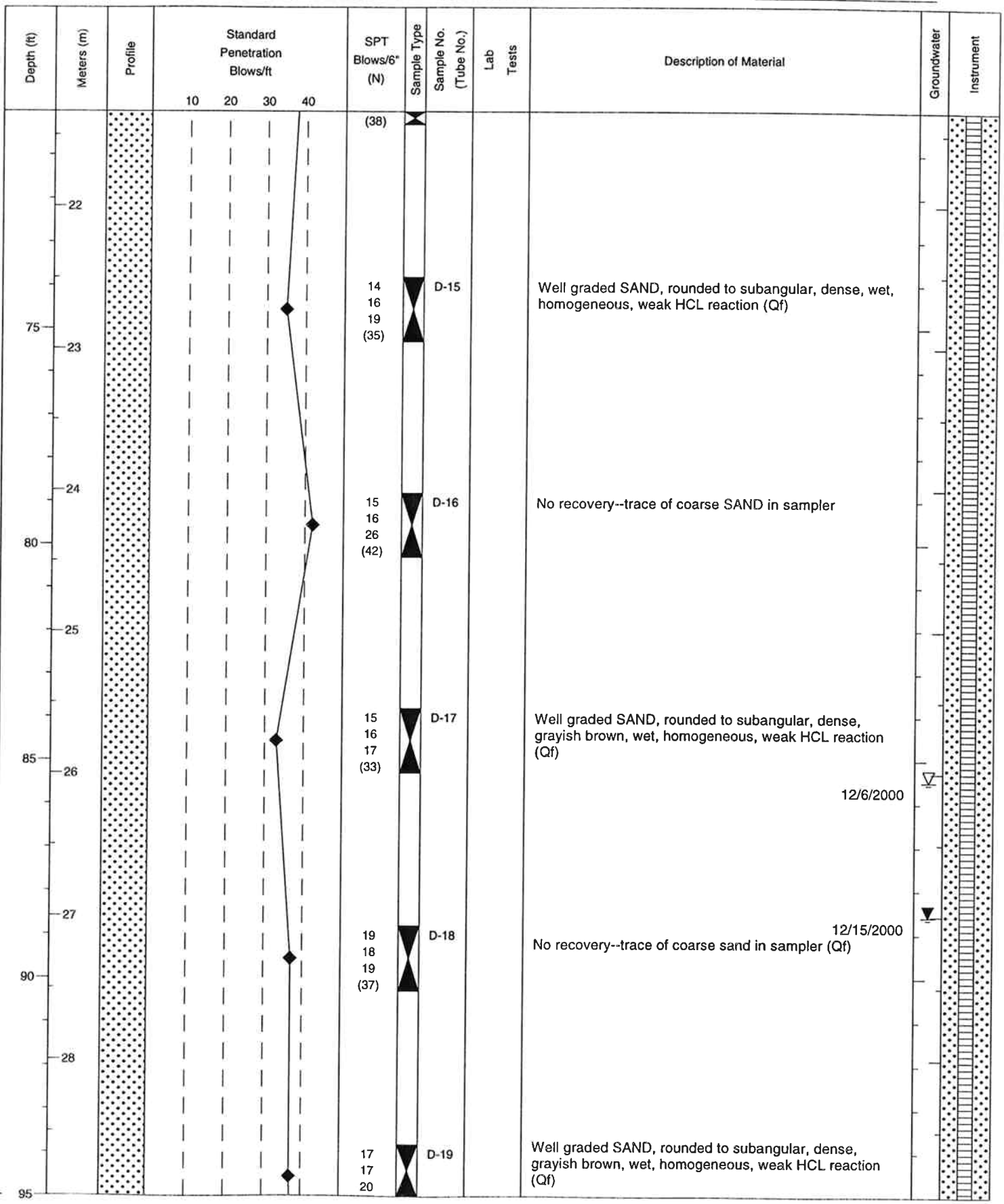

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Figure A-14 Page (4 of 5)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-6-00**

Sheet **5** of **5**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	29			(37)						
	30			17 17 22 (39)		D-20		Well graded SAND, rounded to subangular, dense, grayish brown, wet, homogeneous, strong HCL reaction (Qf)		
100										
	31									
105	32									
	33									
110										
	34									
115	35									
	36									
120										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:04:48 P2

Figure A-14 Page (5 of 5)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 3-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **447+99.231** Offset **549.44** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1900.3 (579.21 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 2, 2000** Completion Date **October 2, 2000** Sheet **1** of **3**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	1			5 6 6 (12)		D-1		Well graded SAND, subrounded to subangular, medium dense, brown, dry, homogeneous, no HCL reaction (Qf)		
10	3			8 9 10 (19)		D-2		Well graded SAND, subrounded to subangular, medium dense, grayish brown, dry, weak HCL reaction (Qf)		
	4							Sandy SILT, loose, brown, moist, no HCL reaction (Qf)		
15	5			3 6 11 (17)		D-3	GS MC = 30	SILT, loose, brown, moist, no HCL reaction (Qf) CLAY with interbedded sand, very stiff, pale brown and brown, moist to wet, blocky, stratified, no HCL reaction (Qf) SAND lense CLAY with interbedded sand, very stiff, pale brown, moist, blocky, stratified, no HCL reaction (Qf)		
20	6									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:03:07 P2

Figure A-15 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 3-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				19 21 25 (46)		D-4		Poorly graded SAND with gravel, subrounded to subangular, dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
25	7 8		>>	15 50/5"		D-5		Poorly graded SAND with gravel, subrounded to subangular, very dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
30	9 10		>>	12 25 30 (55)		D-6		Poorly graded SAND with gravel, subrounded to subangular, very dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
35	11			15 20 27 (47)		D-7		Poorly graded SAND, subrounded to subangular, dense, brown, moist, homogeneous, strong HCL reaction (Qf)		
40	12 13			13 20 21 (41)		D-8		Poorly graded SAND, subrounded to subangular, dense, dark gray and brown, moist, homogeneous, strong HCL reaction (Qf)		
45										

SOIL I:\PROJECT\2441004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:03:08 P2

Figure A-15 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. DP- 3-00

Sheet 3 of 3

PROJECT WSDOT SR395 North Spokane Corridor Project

Job No. XL1154

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	14			11 20 25 (45)		D-9		Poorly graded SAND, subrounded to subangular, dense, very dark gray, moist, homogeneous, strong HCL raction (Qf)		
	15									
50			>>	15 45 26 (71)		D-10	GS MC = 1	Poorly graded SAND, subrounded to subangular, very dense, very dark gray, moist to dry, homogeneous, strong HCL reaction (Qf)		
	16									
55				14 22 27 (49)		D-11		Poorly graded SAND, subrounded to subangular, dense, very dark gray, moist, homogeneous, strong HCL reaction (Qf)		
	17									
	18									
60			>>	24 29 31 (60)		D-12		Poorly graded SAND, subrounded to subangular, very dense, moist, homogeneous, weak HCL reaction (Qf)	01/08/2001 12/15/2000	
	19									
65										
	20									
	21									
70										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01•6:03:09 P2

Figure A-15 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-7-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **450+49.259** Offset **10.66** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1909.2 (581.92 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 2, 2000** Completion Date **October 2, 2000** Sheet **1** of **4**

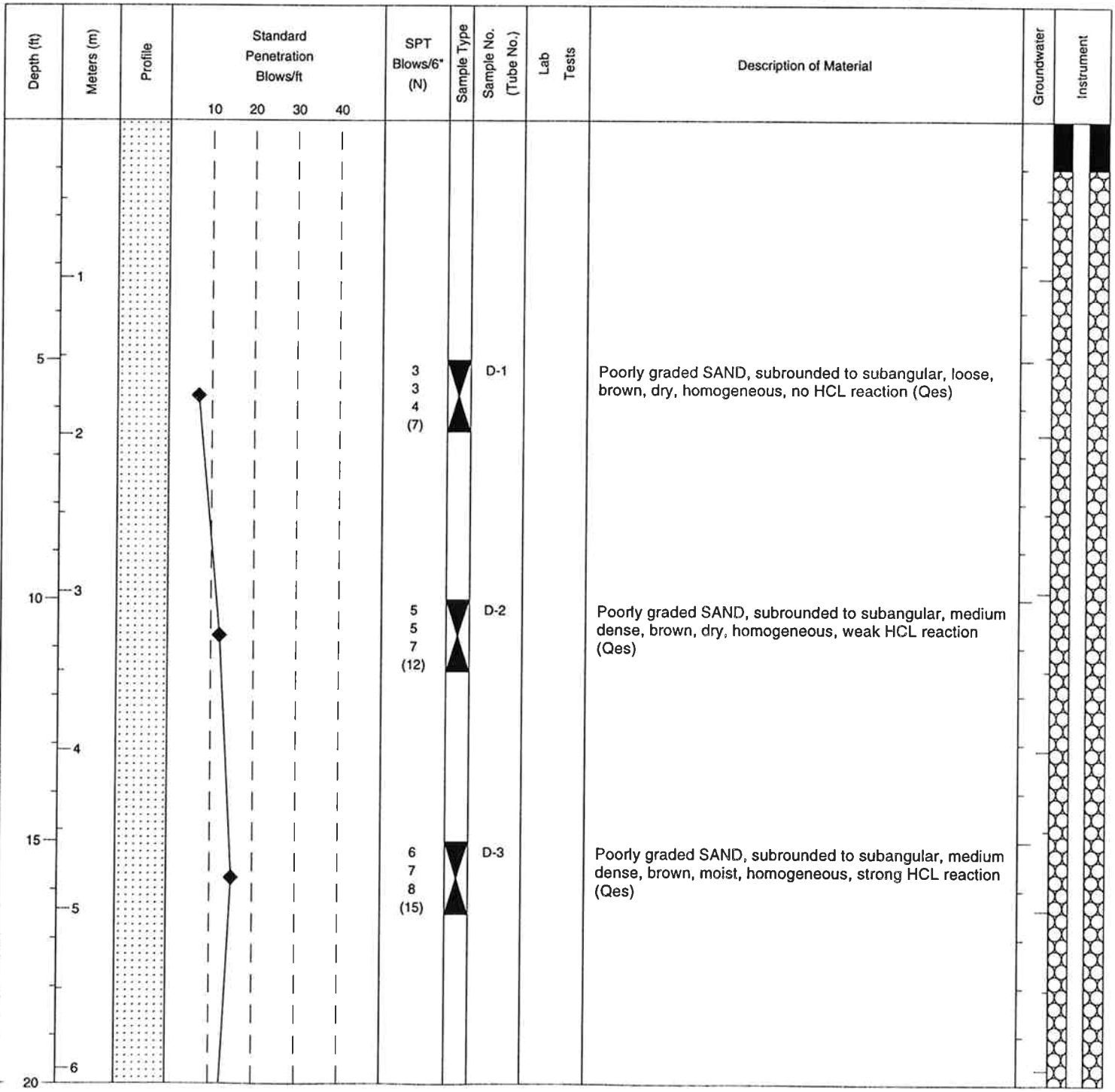

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Figure A-16 Page (1 of 4)

LOG OF TEST BORING

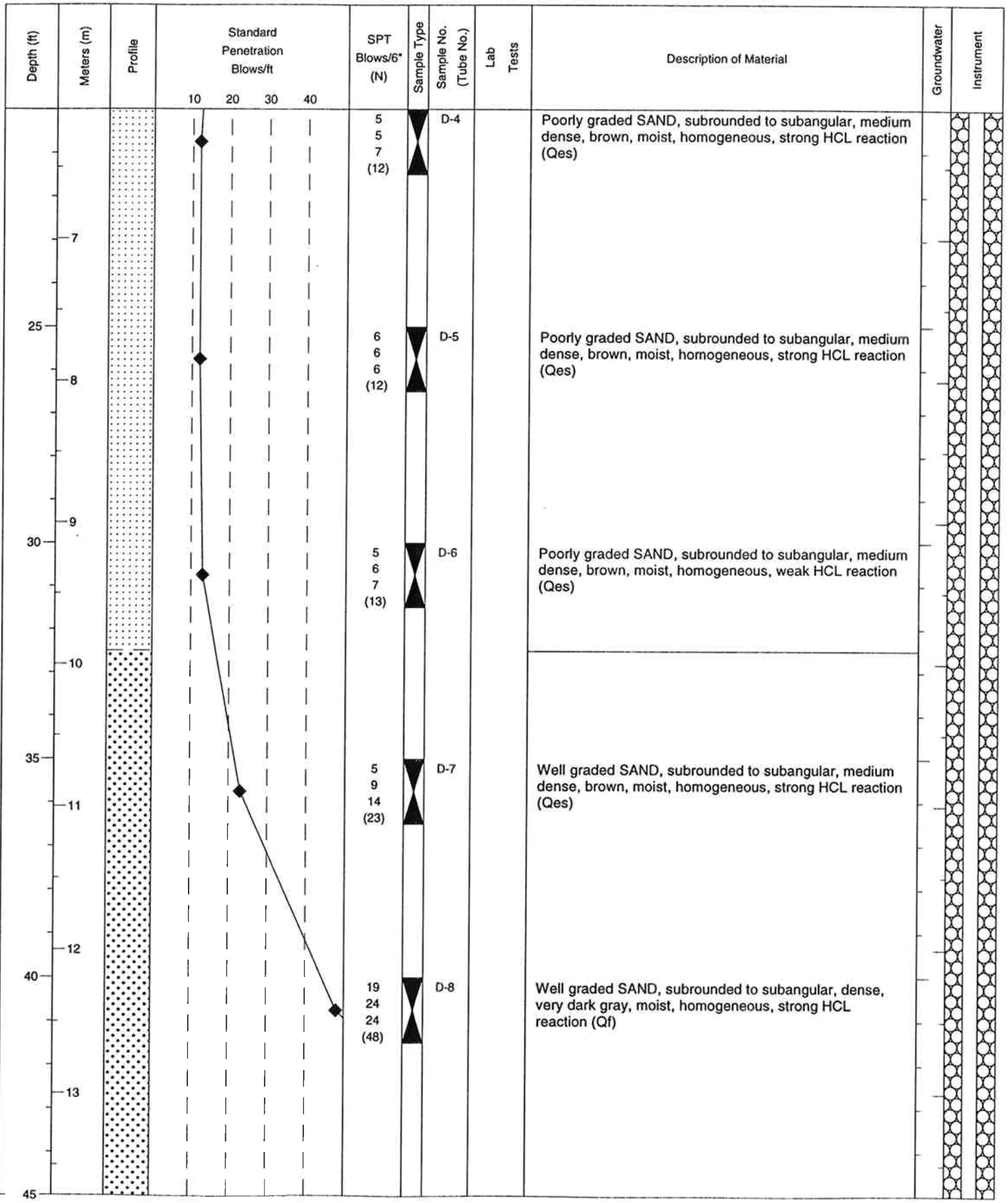
Washington State Department of Transportation

HOLE No. **PH1-7-00**

Sheet **2** of **4**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**



SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01 11:02:02 A2

Figure A-16 Page (2 of 4)

LOG OF TEST BORING

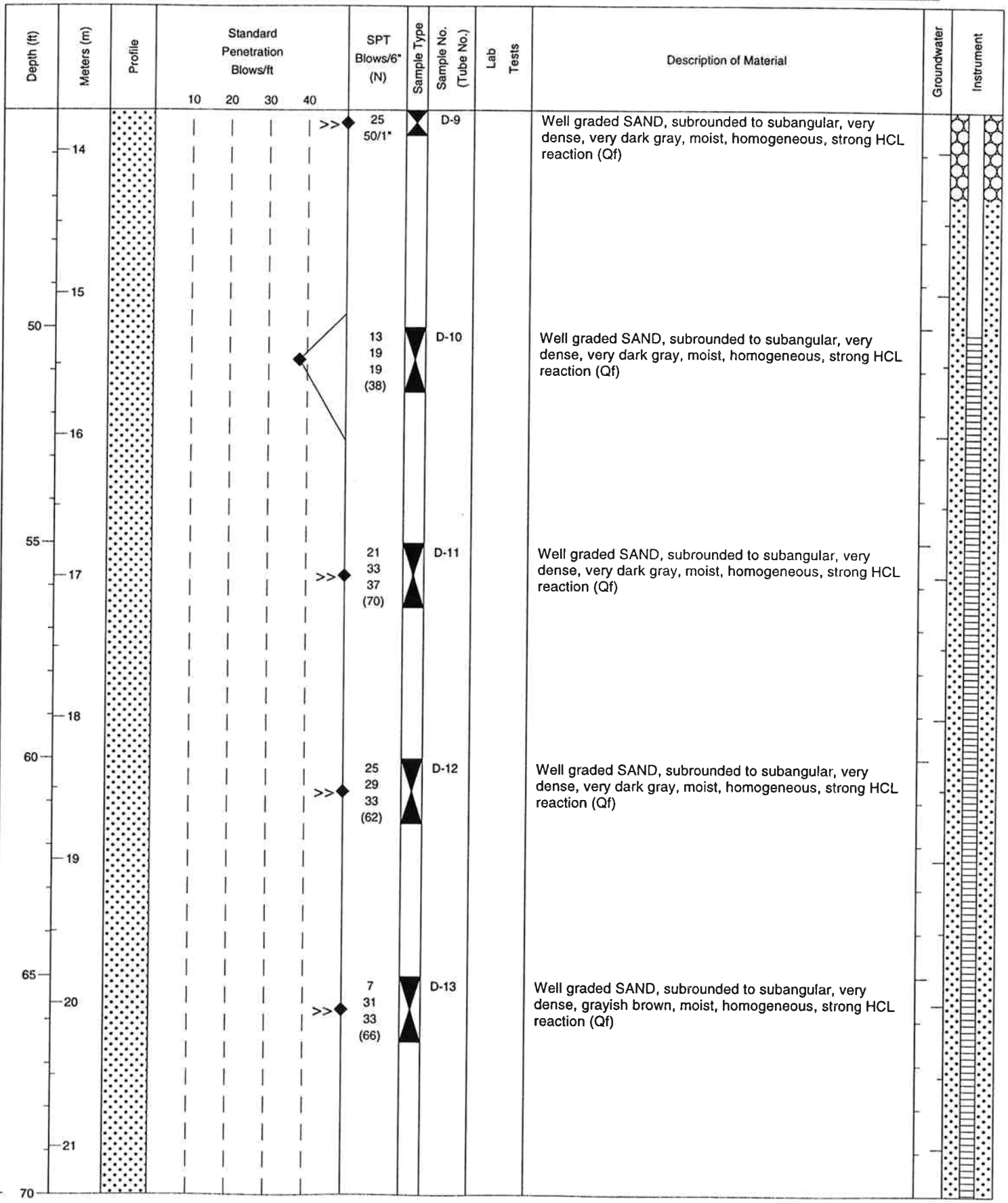
Washington State Department of Transportation

HOLE No. **PH1-7-00**

Sheet **3** of **4**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**



SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:02:03 A2

Figure A-16 Page (3 of 4)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-7-00**

Sheet **4** of **4**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
			>>	21 25 27 (52)		D-14		Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
	22									
75	23		>>	22 26 29 (55)		D-15		Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
	24									
80				15 24 26 (50)		D-16		Well graded SAND, subrounded to subangular, very dense, grayish brown, moist, homogeneous (Qf)		
	25									
85	26									
	27									
90										
	28									
95										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•11:02:04 A2

Figure A-16 Page (4 of 4)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARWSB-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

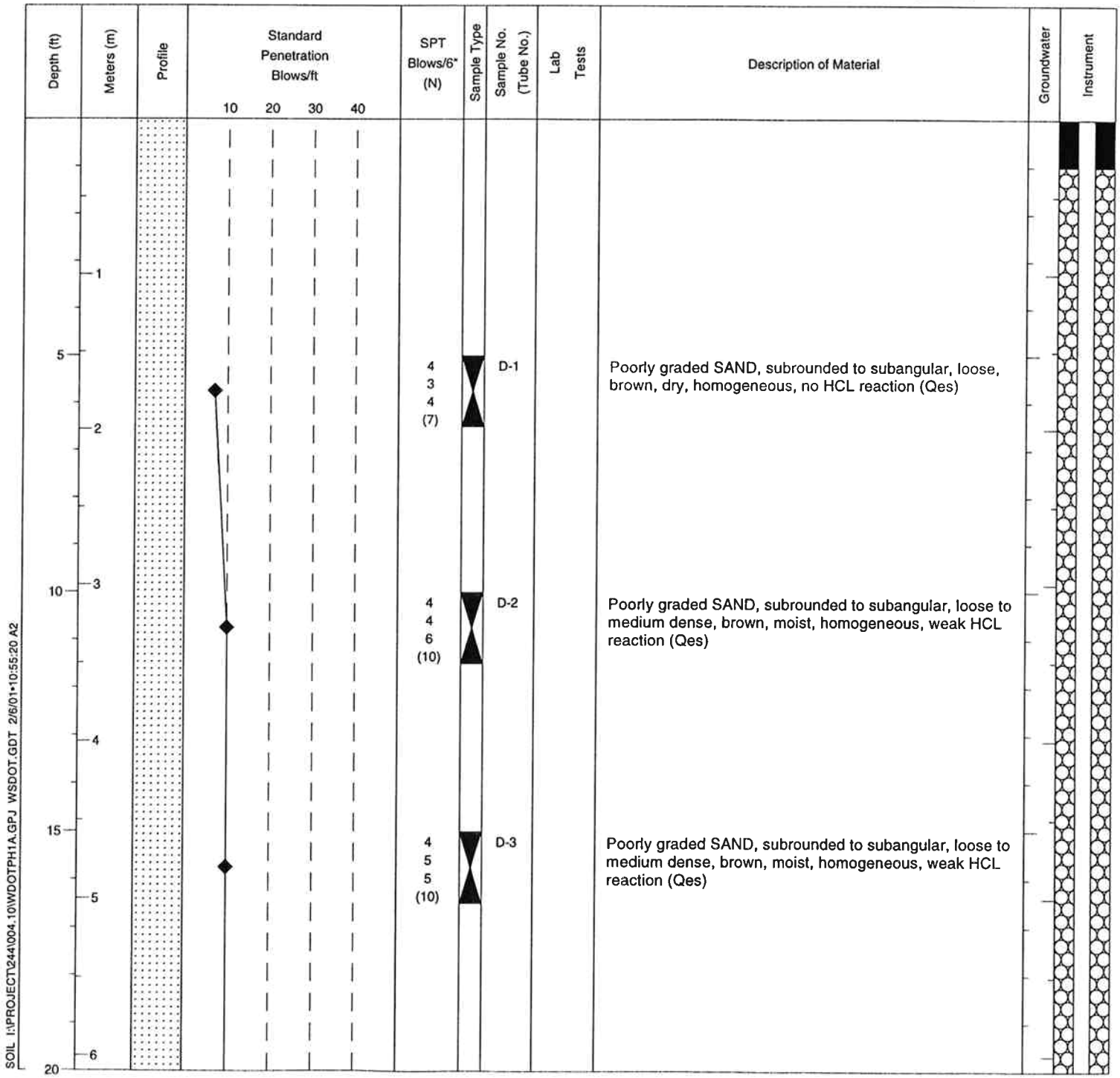
Spokane, Washington S.R. **395**

Station **453+97.587** Offset **-409.4** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1861.0 (567.23 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 4, 2000** Completion Date **October 4, 2000** Sheet **1** of **2**



SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/6/01•10:55:20 A2

Figure A-17 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARWSB-1-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

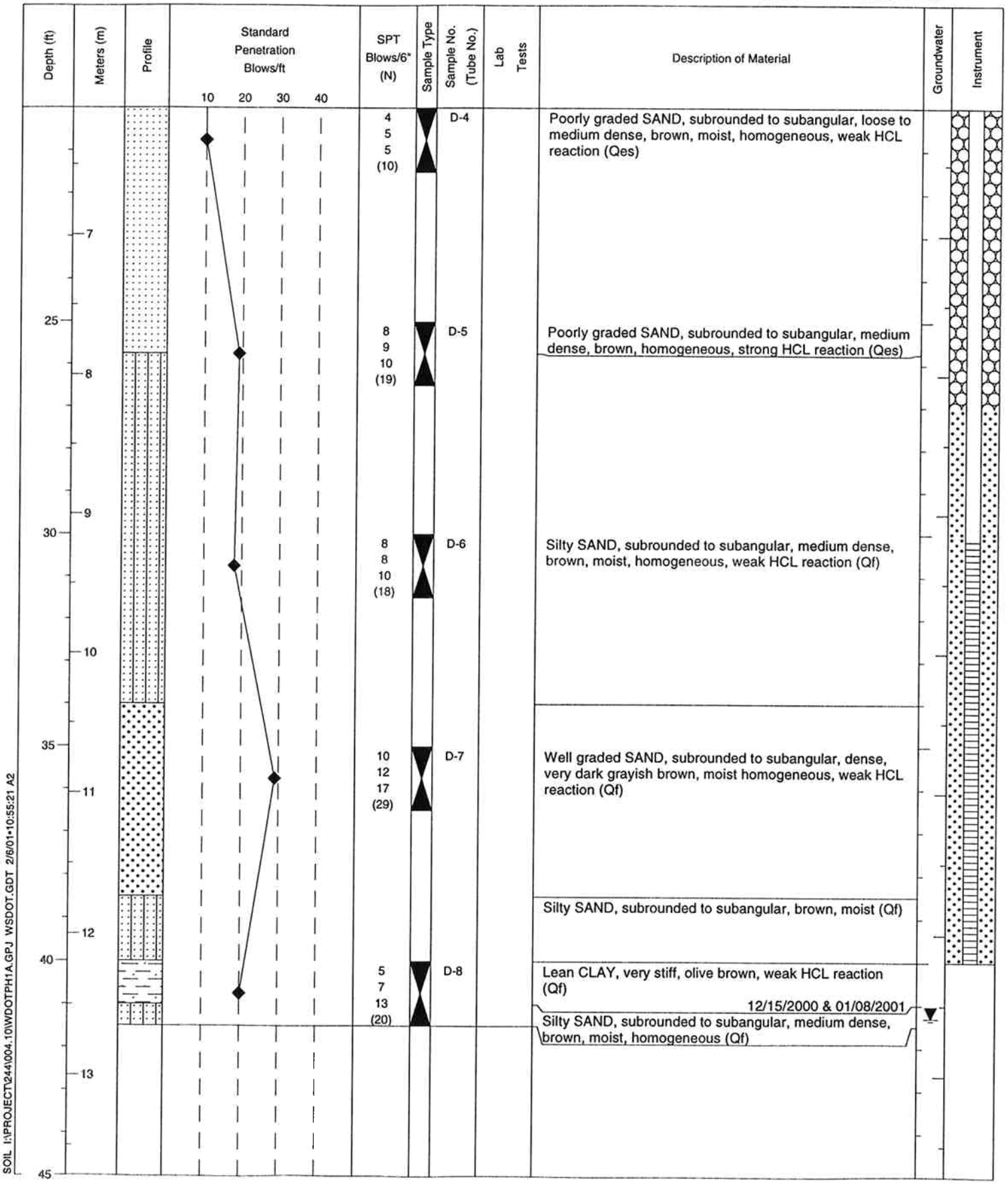


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Figure A-17 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 4-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **456.24718** Offset **-648.09** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1856.9 (565.98 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 4, 2000** Completion Date **October 4, 2000** Sheet **1** of **3**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	1			2 3 5 (8)		D-1		Poorly graded SAND, subrounded to subangular, loose, brown, dry, homogeneous, weak HCL reaction (Qes)		
10	3			4 4 4 (8)		D-2		Poorly graded SAND, subrounded to subangular, loose, brown, moist, homogeneous, strong HCL reaction (Qes)		
15	5			3 3 5 (8)		D-3		Poorly graded SAND, subrounded to subangular, loose, brown, moist, homogeneous, strong HCL reaction (Qes)		
20	6									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01•10:58:37 A2

Figure A-18 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. DP- 4-00

Sheet 2 of 3

PROJECT WSDOT SR395 North Spokane Corridor Project

Job No. XL1154

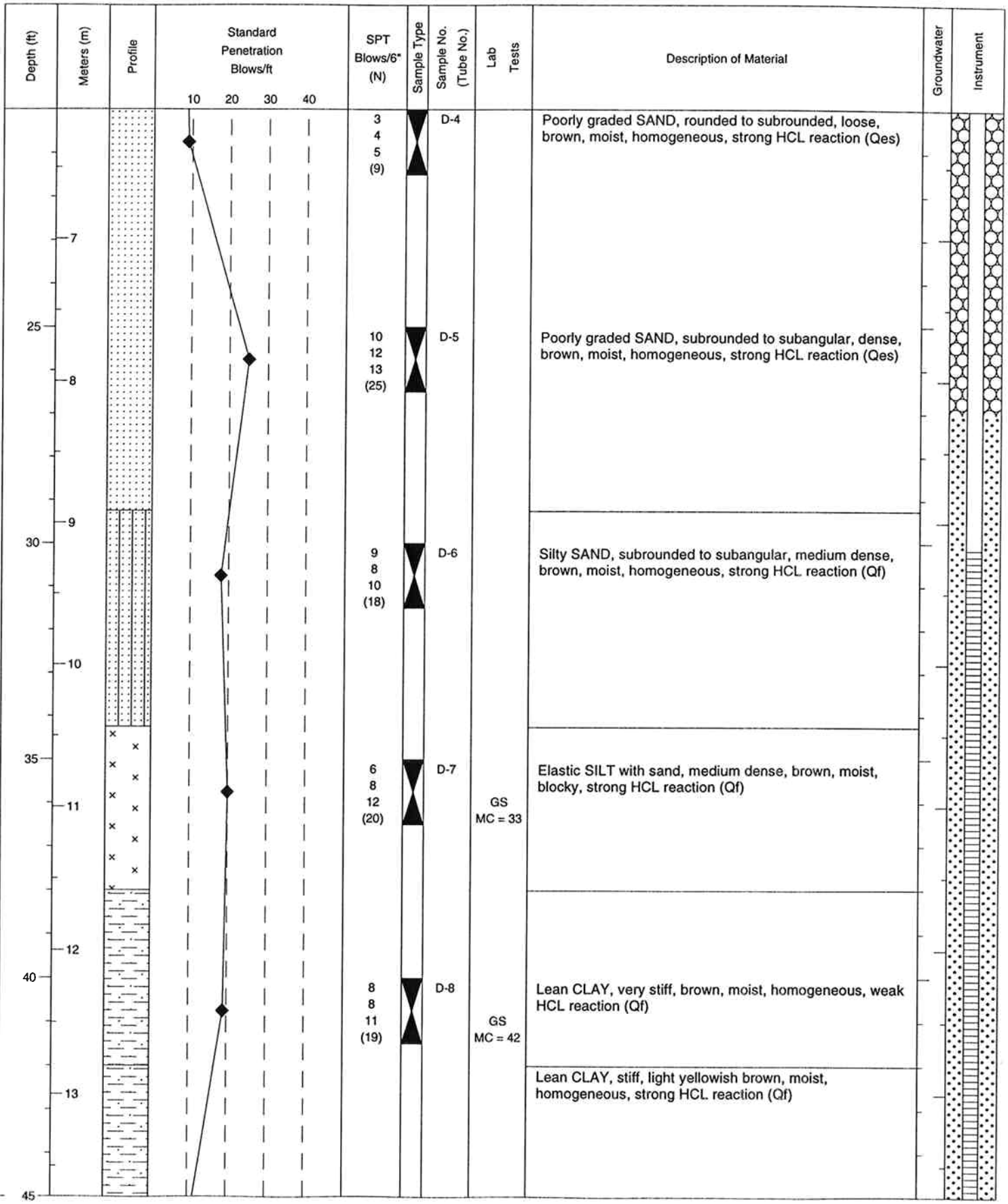

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Figure A-18 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 4-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

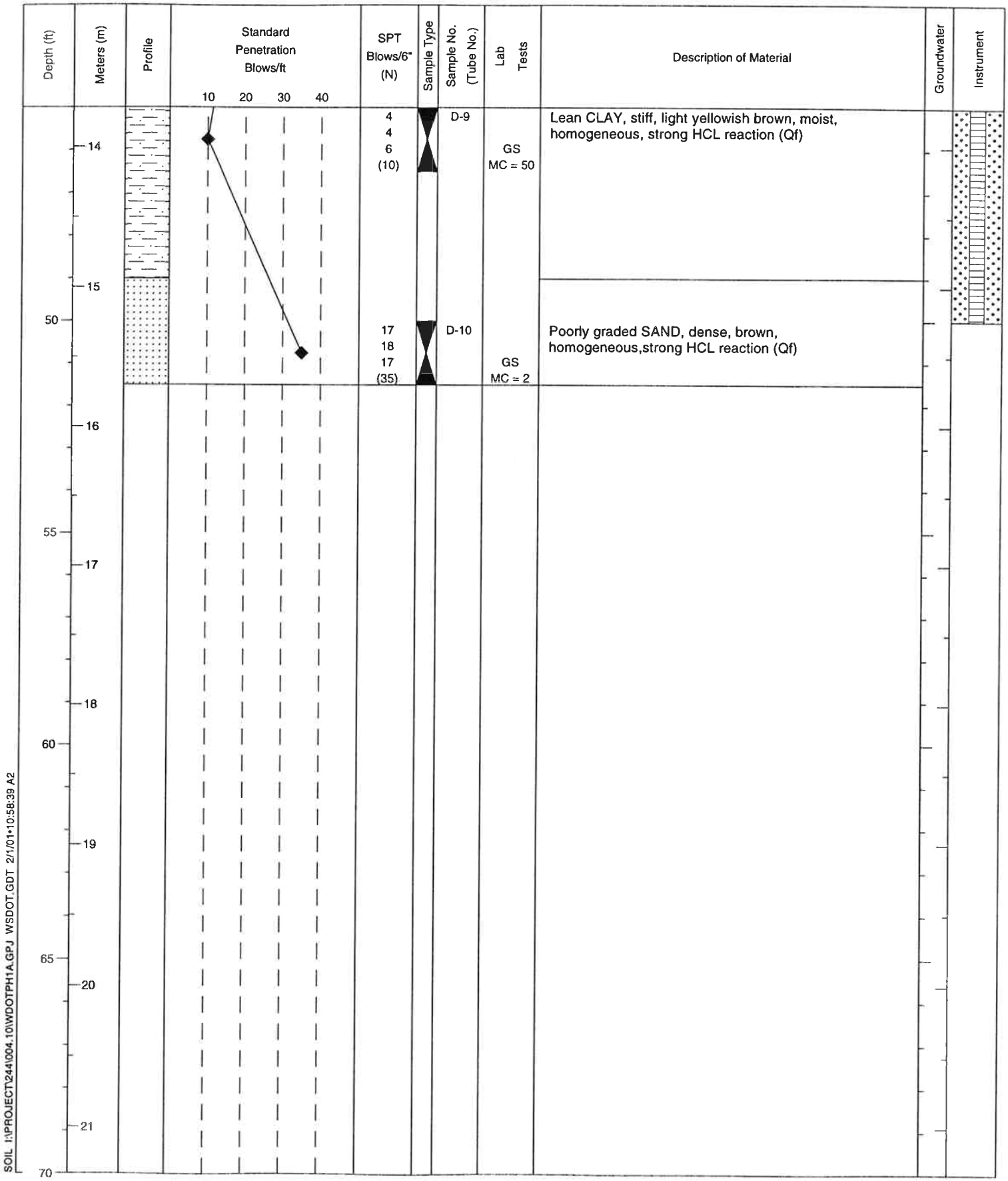

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Figure A-18 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARW-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **456+98.566** Offset **-2.65** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1847.5 (563.12 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 4, 2000** Completion Date **October 4, 2000** Sheet **1** of **3**

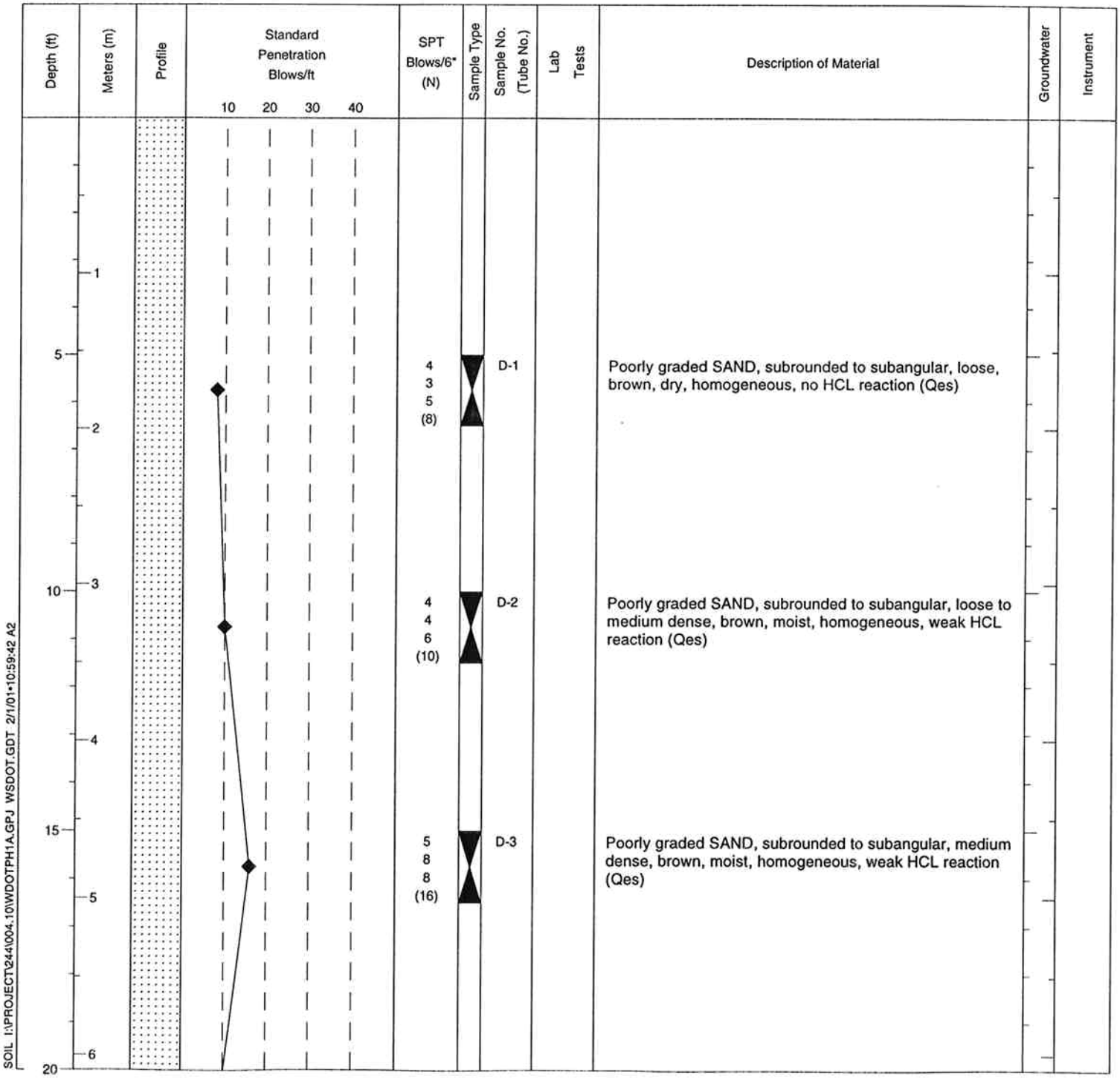

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Figure A-19 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARW-1-00**

Sheet 2 of 3

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

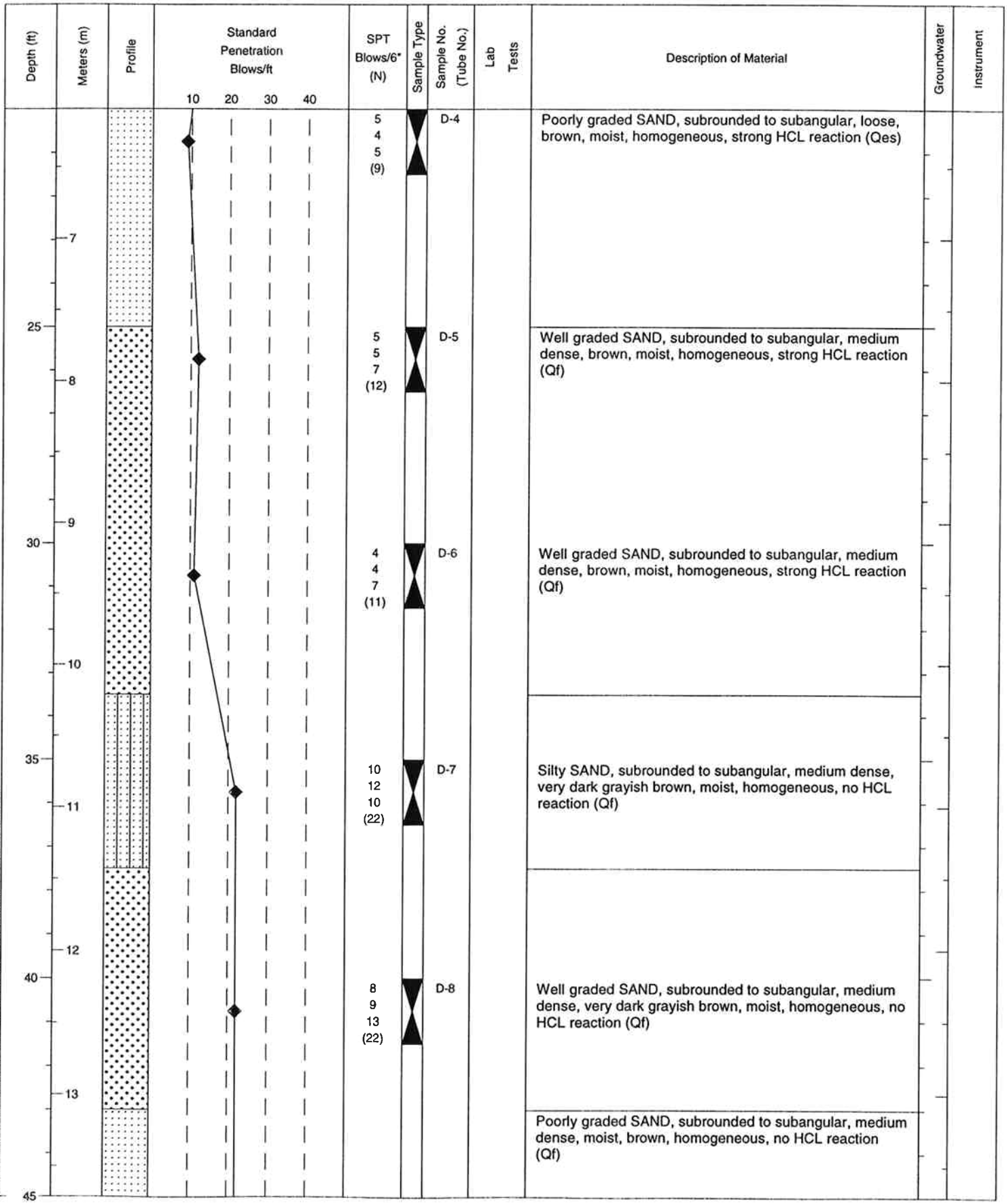

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Figure A-19 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARW-1-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
	14			9 9 13 (22)		D-9		Silty SAND, subangular to rounded, medium dense, brown, wet, homogeneous, no HCL reaction (Qf)		
	15									
50				7 9 7 (16)		D-10		Silty SAND, subangular to rounded, medium dense, brown, wet, homogeneous, no HCL reaction (Qf)		
	16									
55										
	17									
	18									
60										
	19									
65										
	20									
	21									
70										

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01 10:59:44 A2

Figure A-19 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARW-2-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **458+02.055** Offset **-169.04** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1850.3 (563.97 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 3, 2000** Completion Date **October 3, 2000** Sheet **1** of **3**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	1			3 2 4 (6)		D-1		Poorly graded SAND, subrounded to subangular, loose, brown, moist, homogeneous, slight HCL reaction (Qes)		
10	3			3 3 5 (8)		DP-2		Poorly graded SAND, subrounded to subangular, loose, brown, moist, strong HCL reaction (Qes)		
15	5			4 4 4 (8)		DP-3		Poorly graded SAND, subrounded to subangular, loose, brown, moist, homogeneous, weak HCL reaction (Qes)		
20	6									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:04:12 P2

Figure A-20 Page (1 of 3)

LOG OF TEST BORING

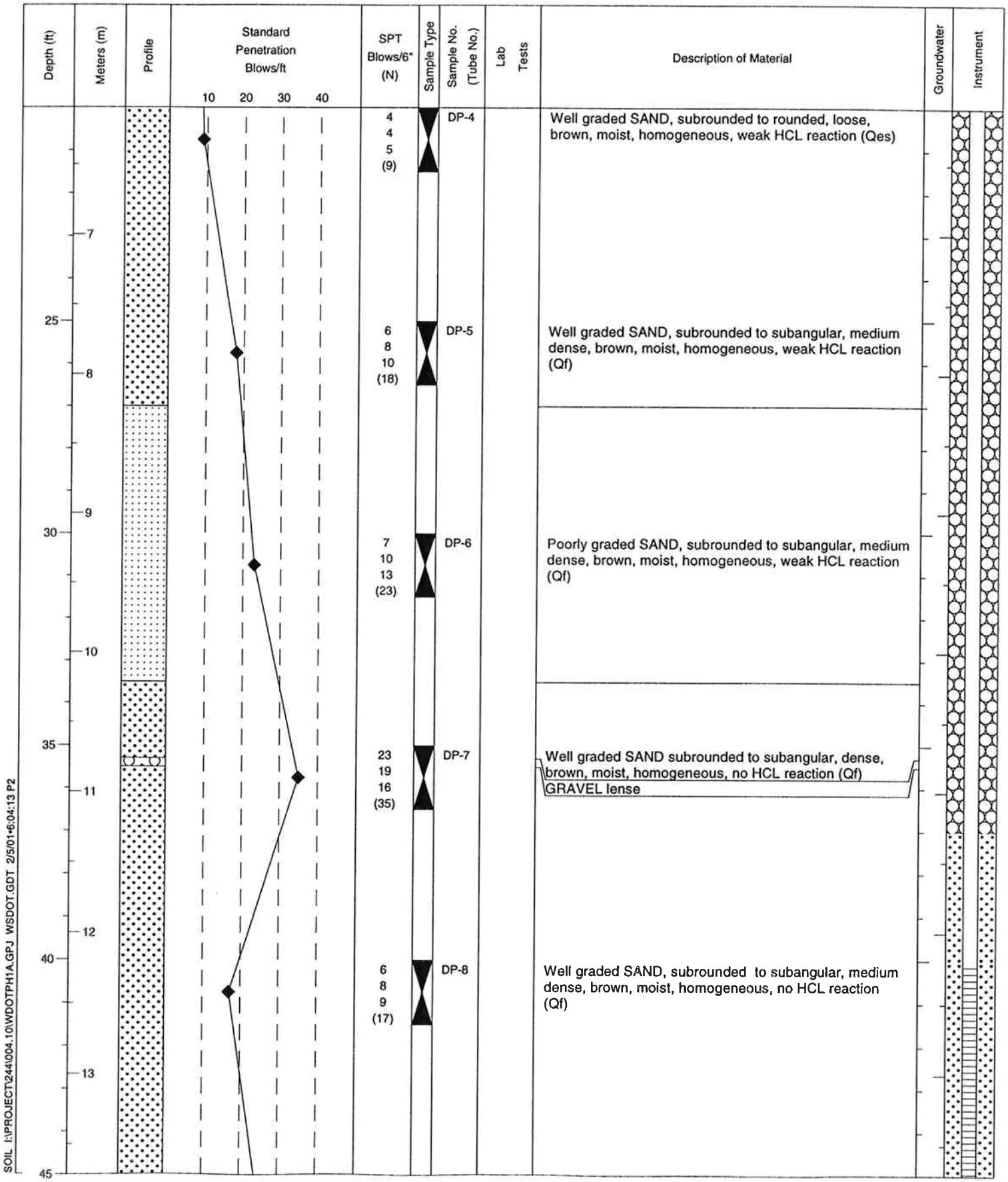
Washington State Department of Transportation

HOLE No. **FARW-2-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**



SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01+6:04:13 P2

Figure A-20 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **FARW-2-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

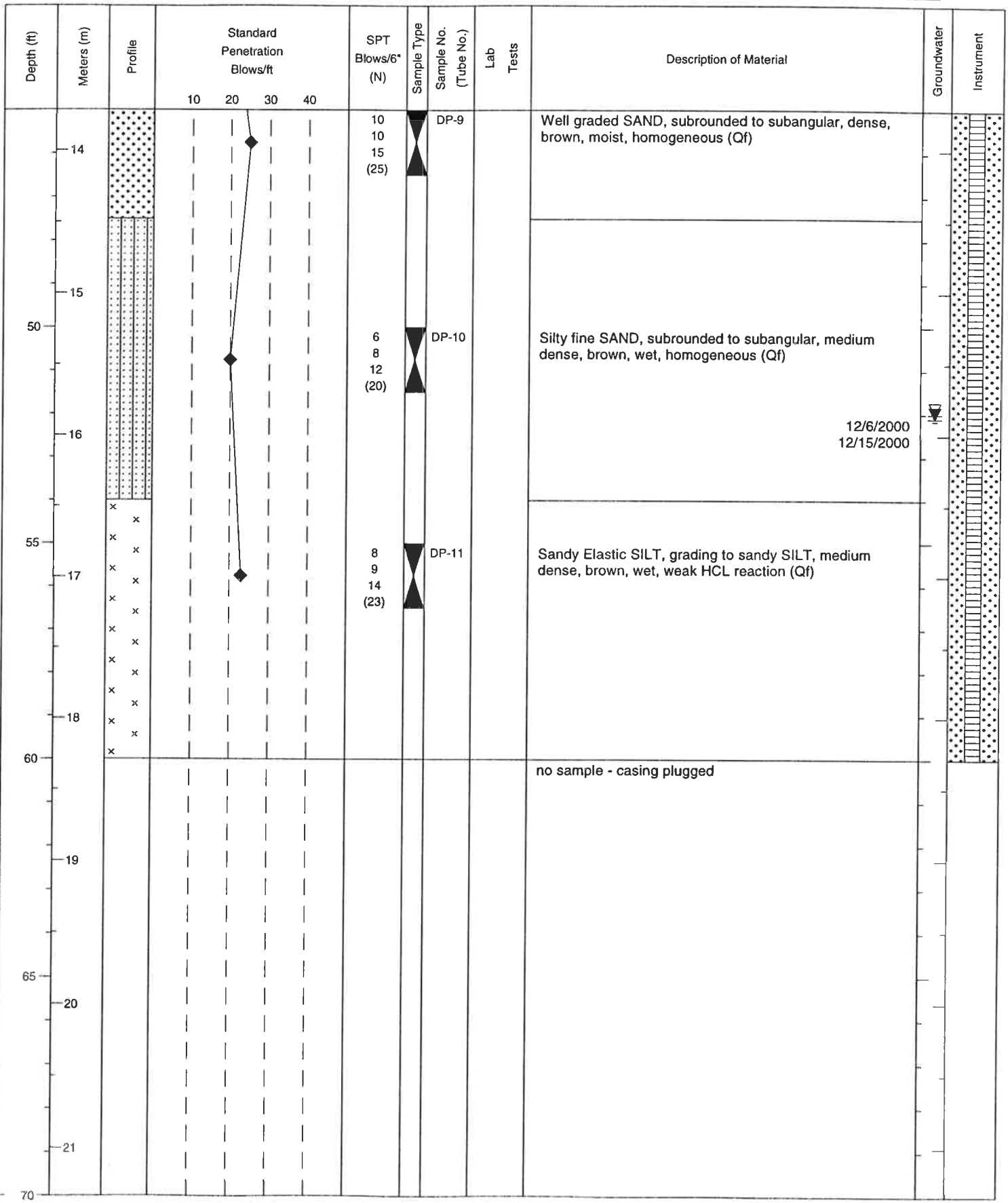


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Figure A-20 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-12-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **463+12.649** Offset **-1651.84** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1838.3 (560.31 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 5, 2000** Completion Date **October 5, 2000** Sheet **1** of **3**

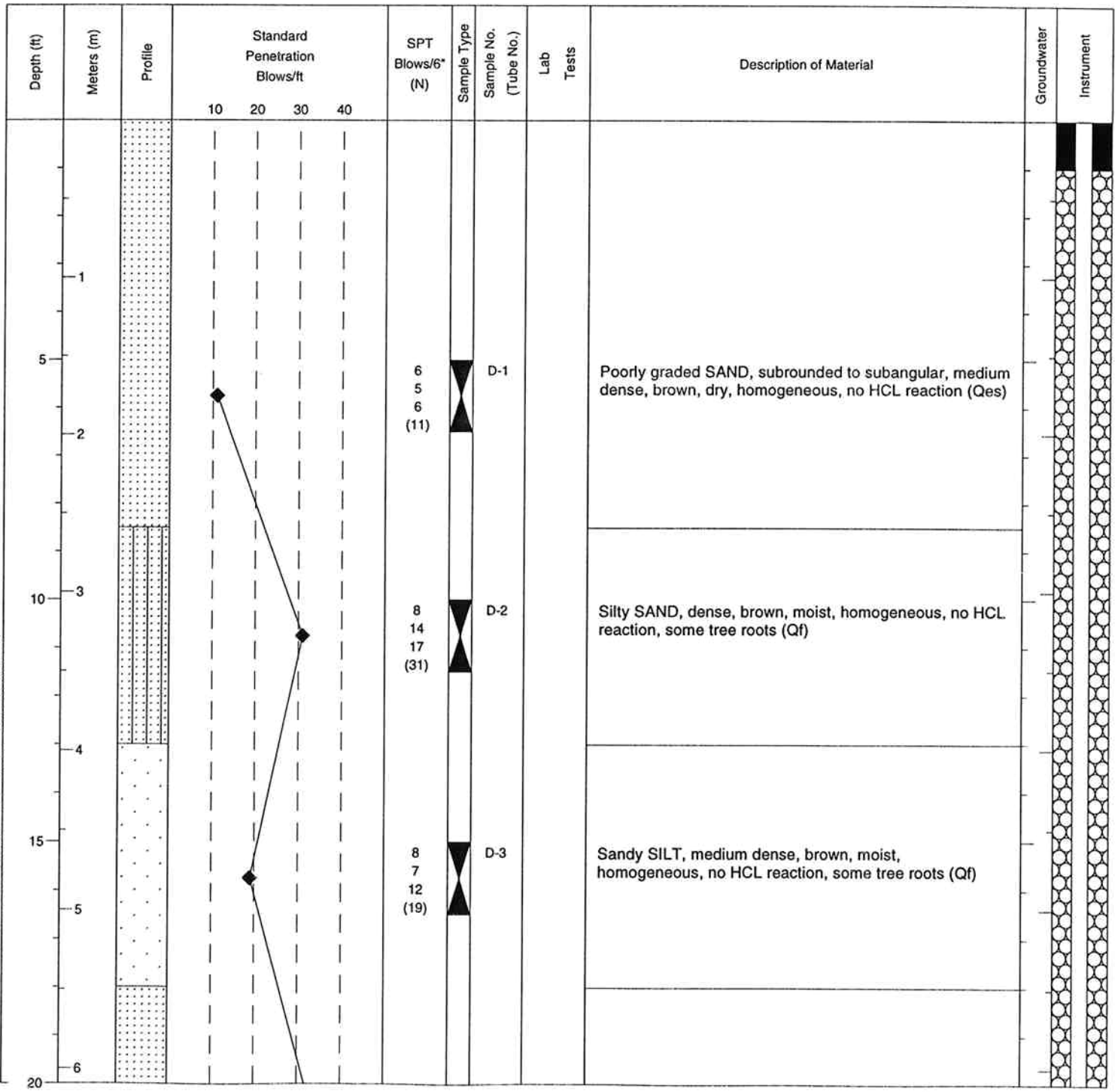

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Figure A-21 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-12-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

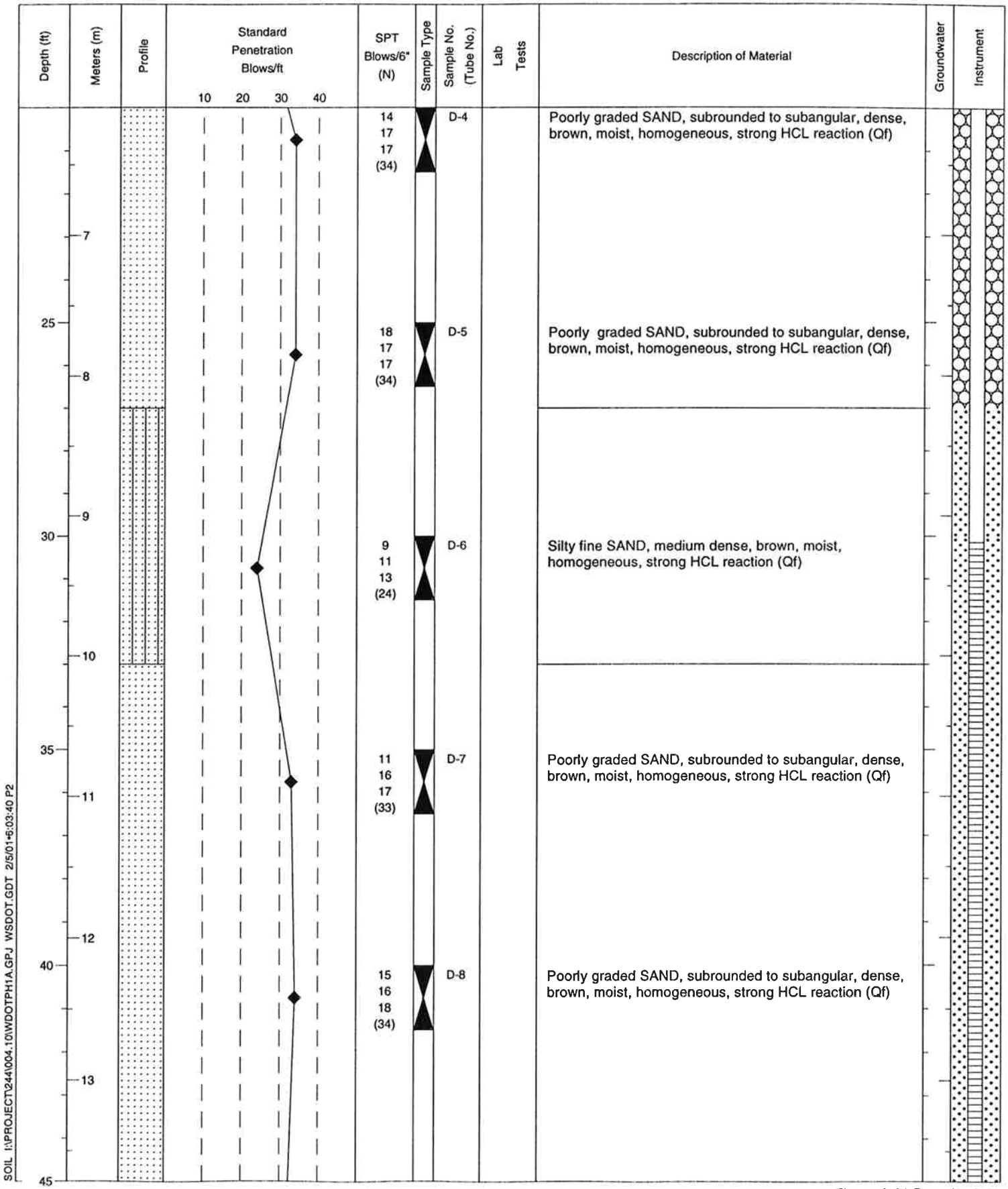

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Figure A-21 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-12-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

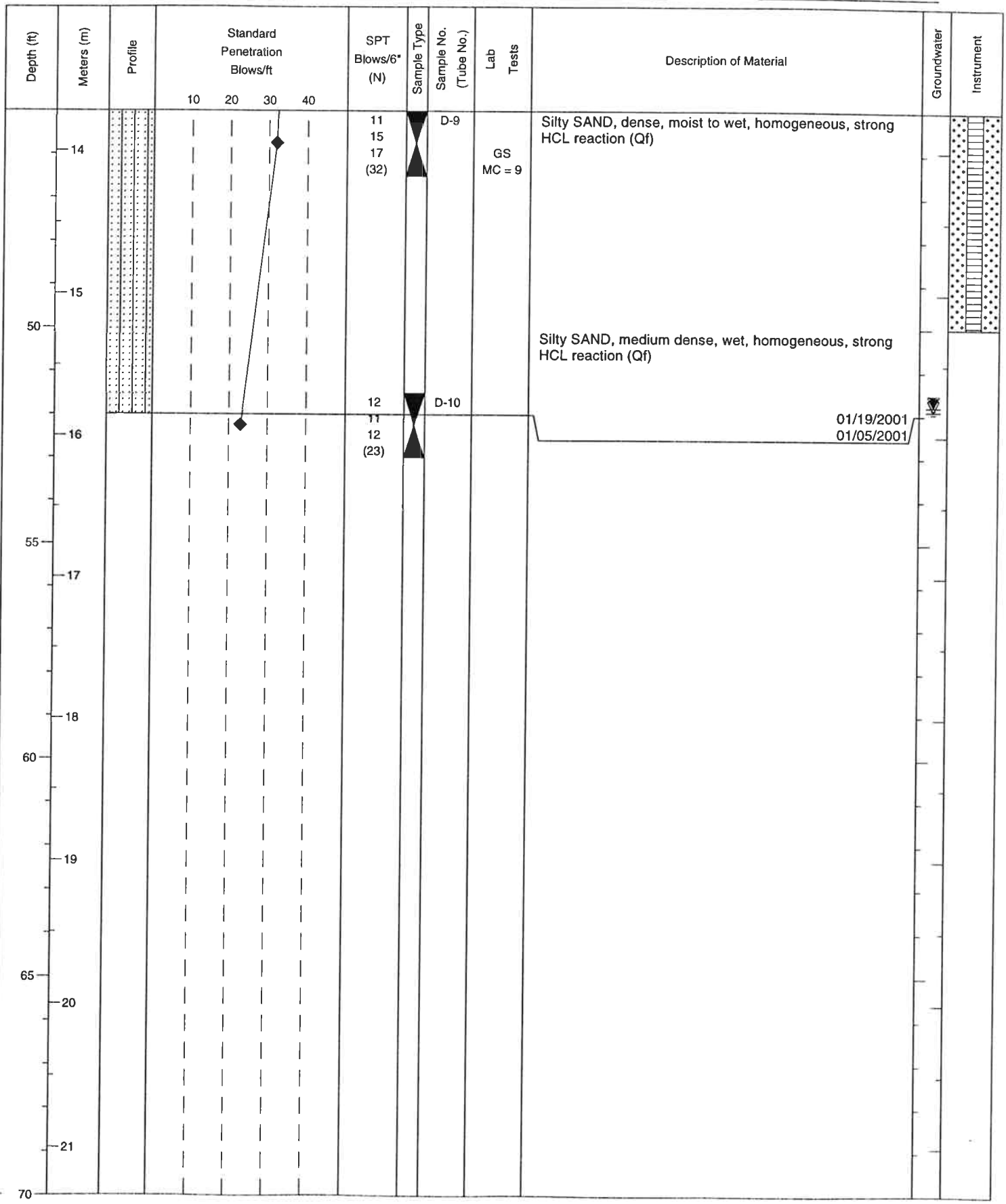

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Figure A-21 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2EB-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **464+45.111** Offset **581.72** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1838.9 (560.50 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 19, 2000** Completion Date **October 19, 2000** Sheet **1** of **2**

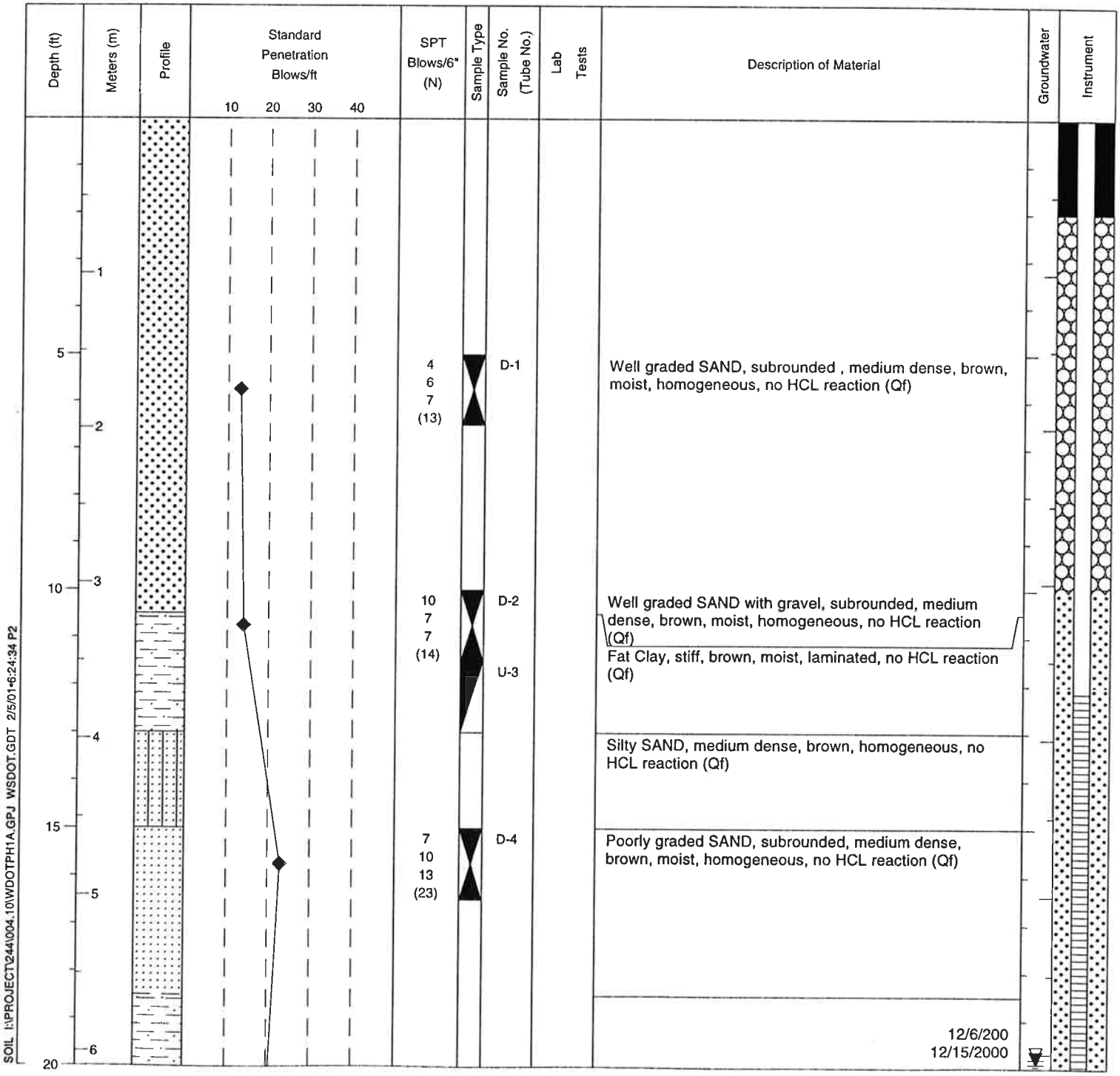

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Figure A-22 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2EB-1-00**

Sheet 2 of 2

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

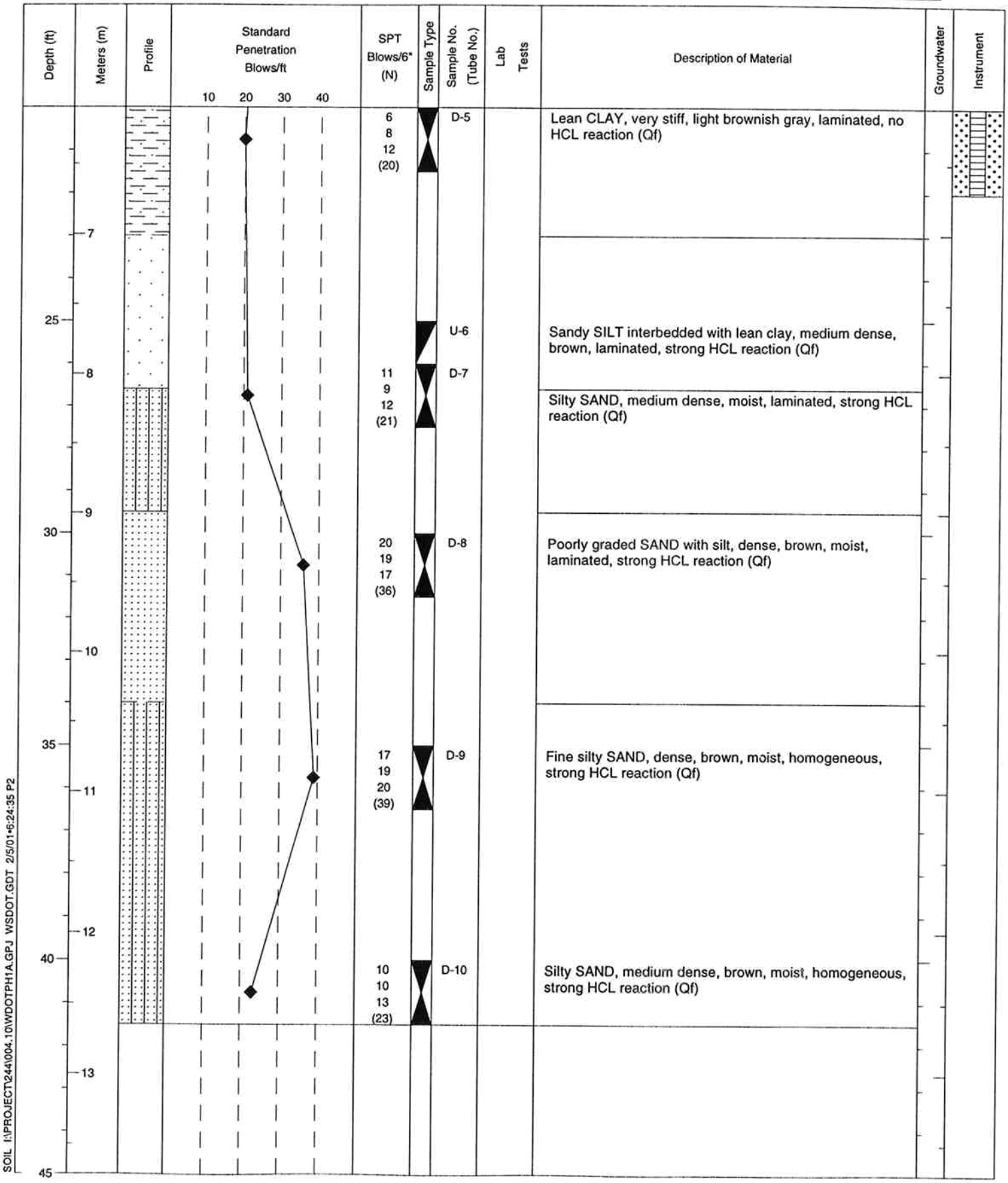

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Figure A-22 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-8-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **465+71.821** Offset **10.40** C.S.

Equipment **B-61** Casing **HWT** Ground El **1836.1 (559.64 m)**

Method of Boring **HWT casing advance, HQ core**

Start Date **October 19, 2000** Completion Date **October 19, 2000** Sheet **1** of **2**

Depth (ft)	Meters (m)	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
5	1		4 2 8 (10)		D-1		Well graded SAND, subrounded, loose, brown, moist, homogeneous, no HCL reaction (Qf)
10	3		6 6 10 (16)		D-2		Well graded SAND, subrounded, medium dense, brown, moist, homogeneous, strong HCL reaction (Qf)
15	5		8 9 8 (17)		D-3		Well graded SAND, subrounded, medium dense, brown, wet, homogeneous, strong HCL reaction (Qf)
20	6						Lean CLAY, stiff, brown, mottled, wet, laminated, no HCL reaction (Qf)

Groundwater

Instrument

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/5/01 6:05:07 P2

Figure A-23 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **PH1-8-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

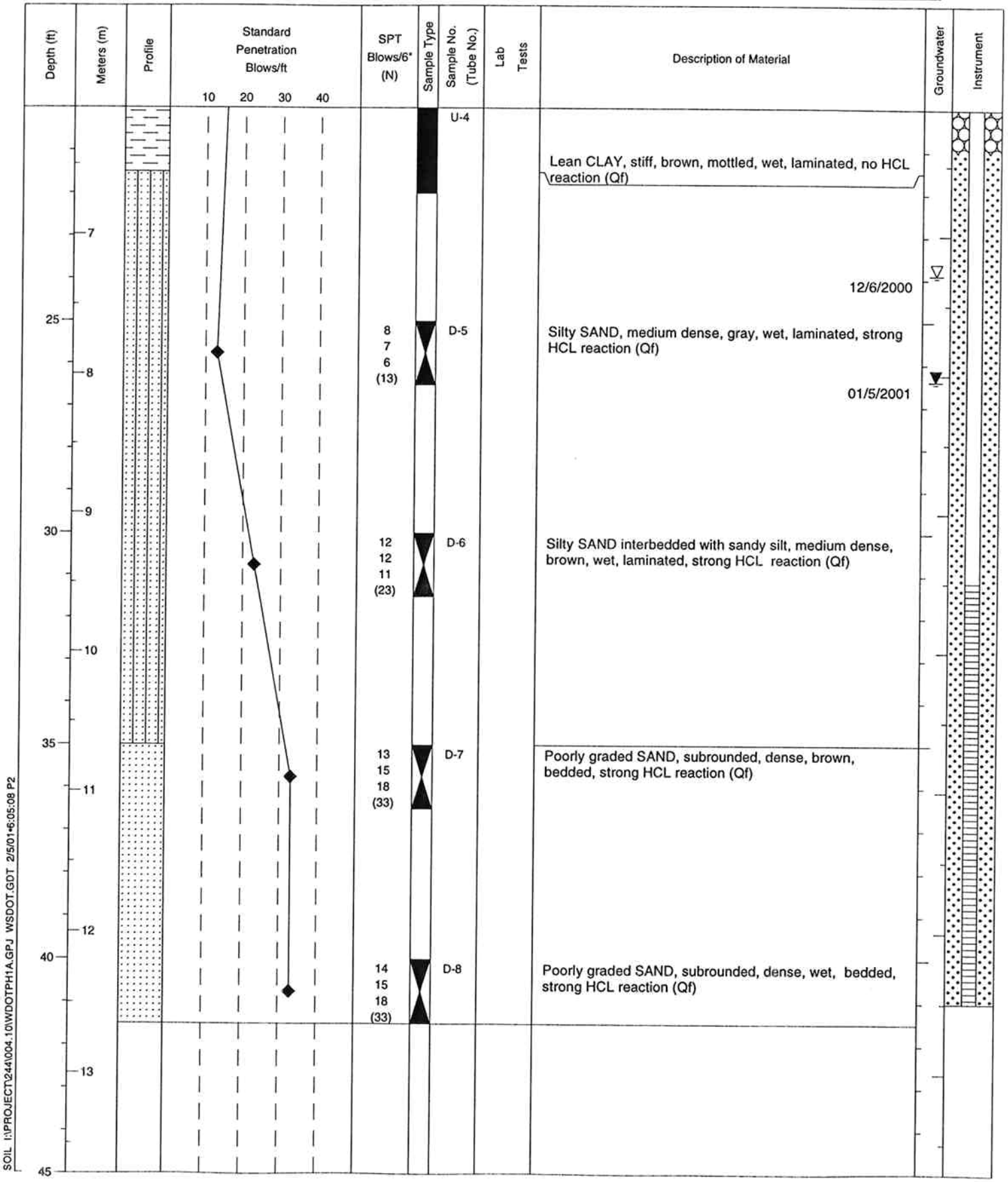

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Figure A-23 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-13-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **466+18.06** Offset **-440.05** C.S.

Equipment **B-61** Casing **HWT** Ground El **1840.6 (561.01 m)**

Method of Boring **HWT casing advance, HQ core**

Start Date **December 1, 2000** Completion Date **December 1, 2000** Sheet **1** of **3**

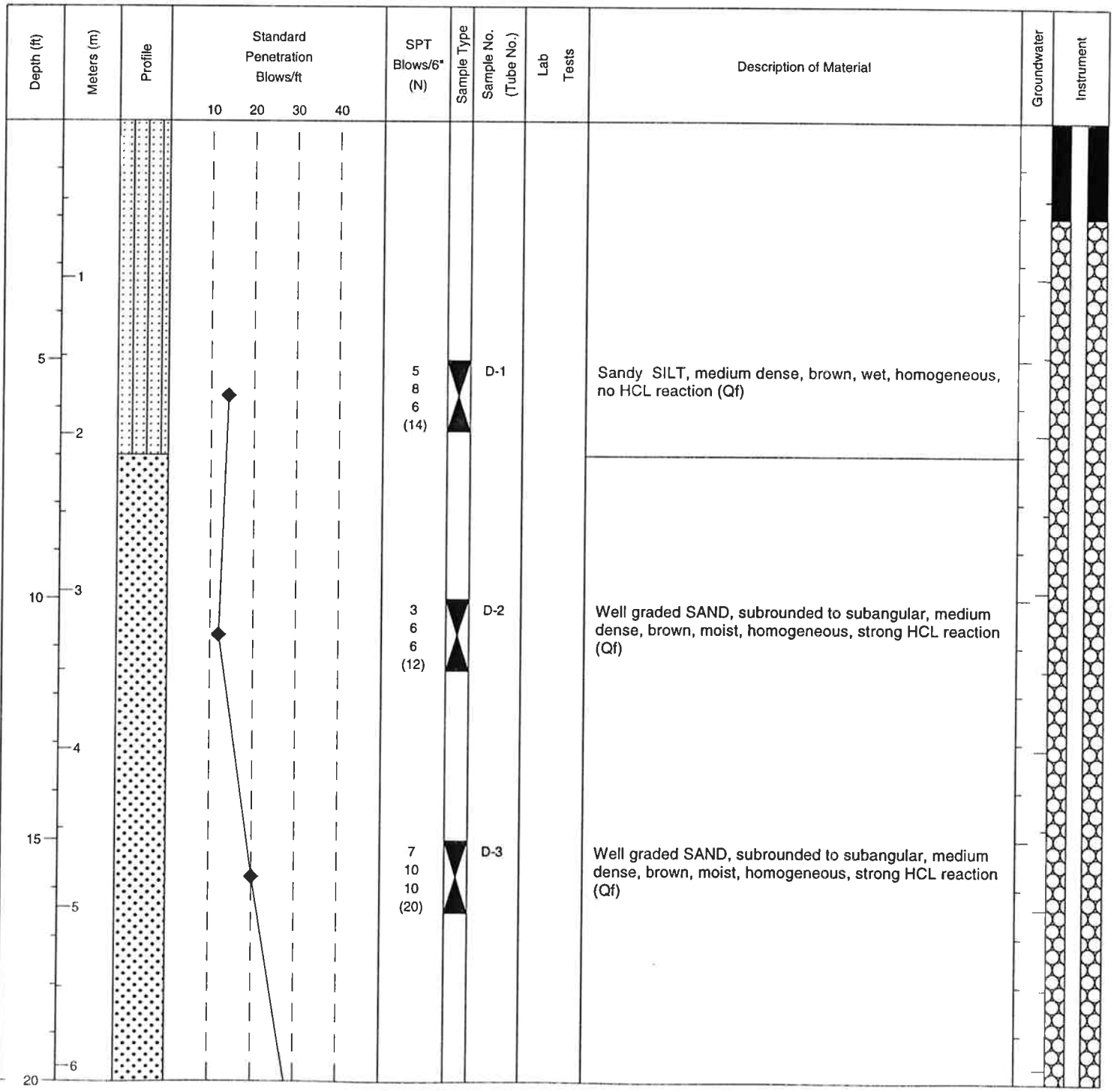

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Figure A-24 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-13-00**

Sheet **2** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

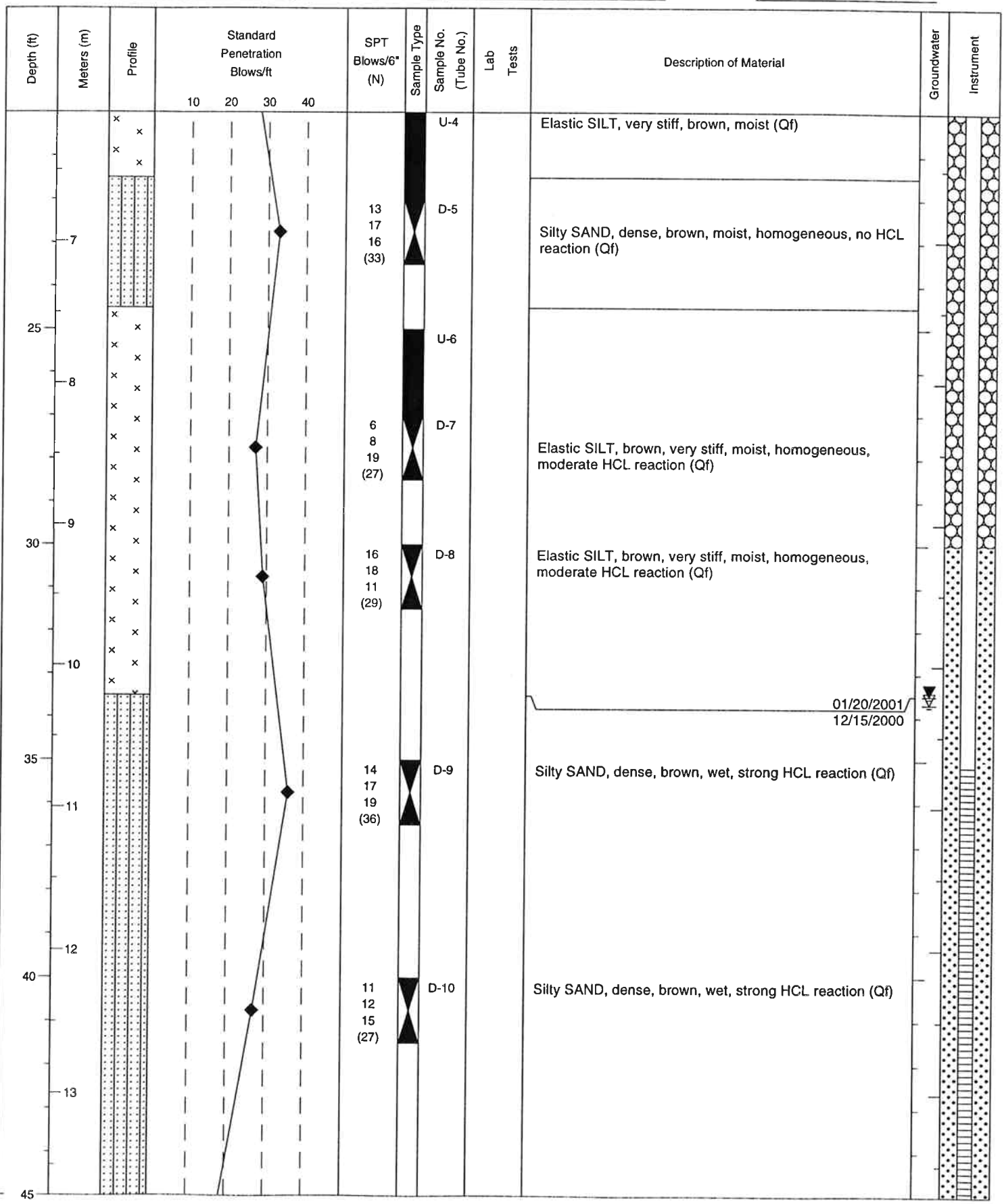

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Figure A-24 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP-13-00**

Sheet **3** of **3**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

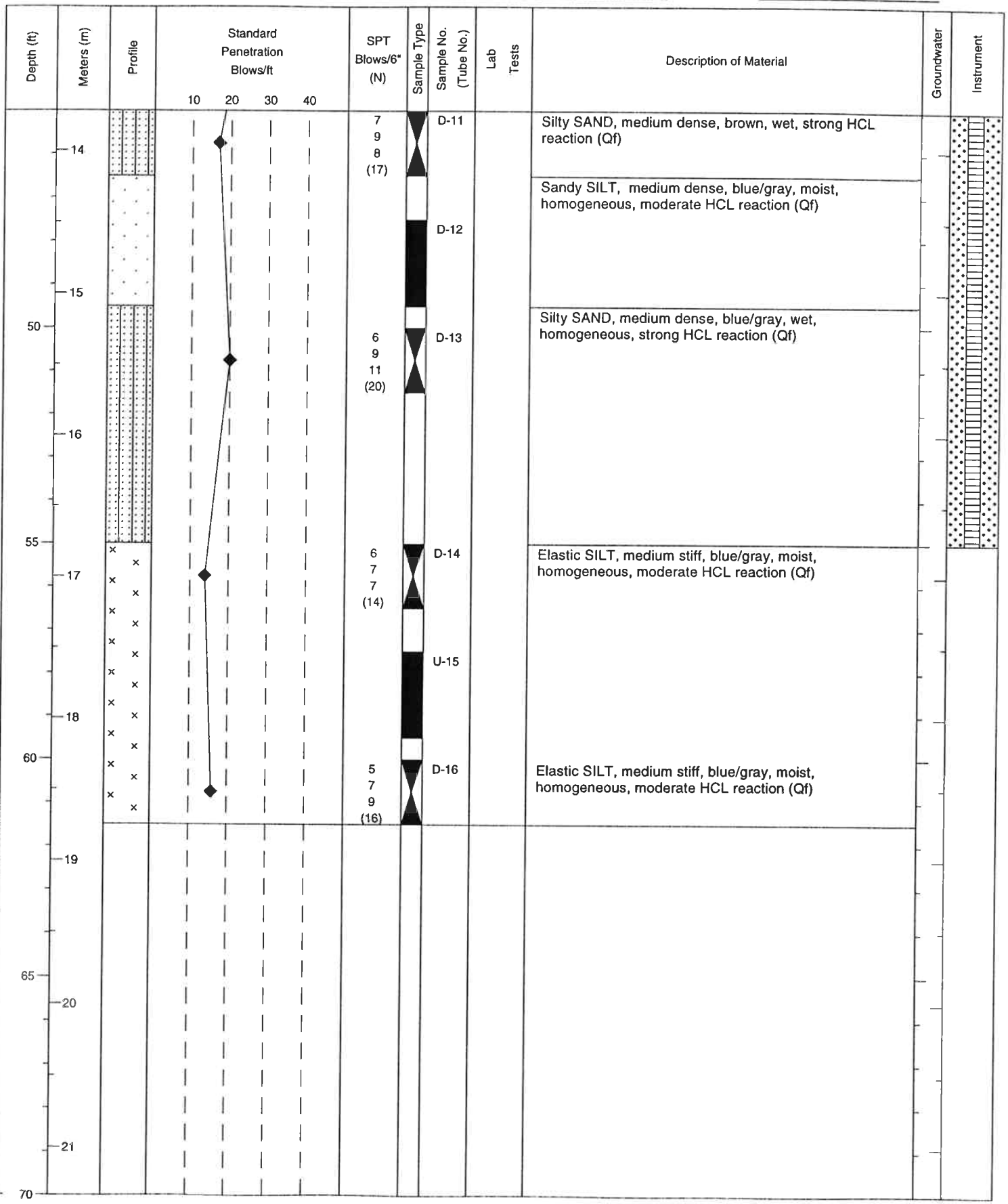

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Figure A-24 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **DP- 5-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **466+68.423** Offset **471.15** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1841.2 (561.20 m)**

Method of Boring **HWT casing advance**

Start Date **October 19, 2000** Completion Date **October 19, 2000** Sheet **1** of **3**

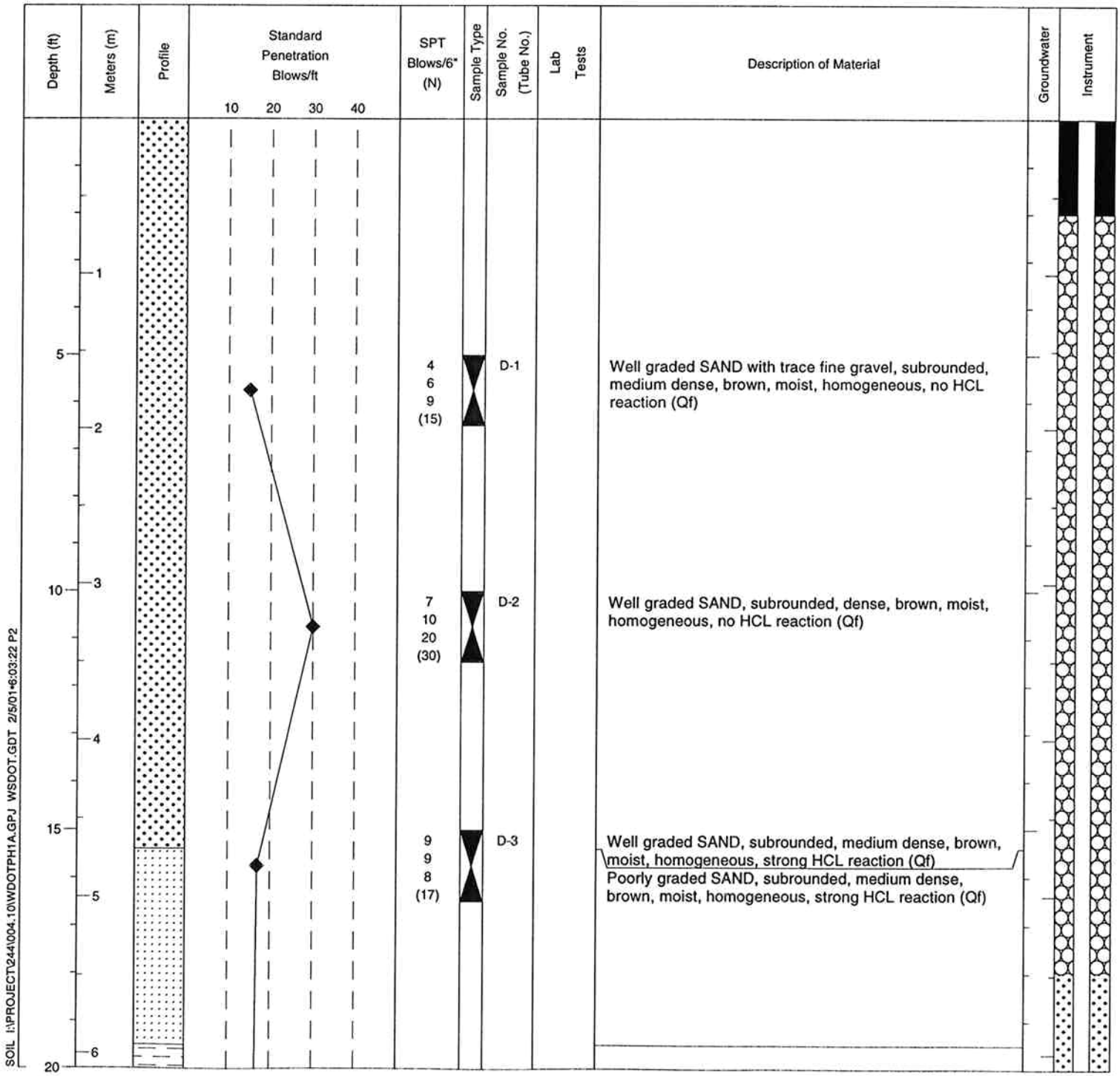

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Figure A-25 Page (1 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. DP- 5-00

Sheet 2 of 3

PROJECT WSDOT SR395 North Spokane Corridor Project

Job No. XL1154

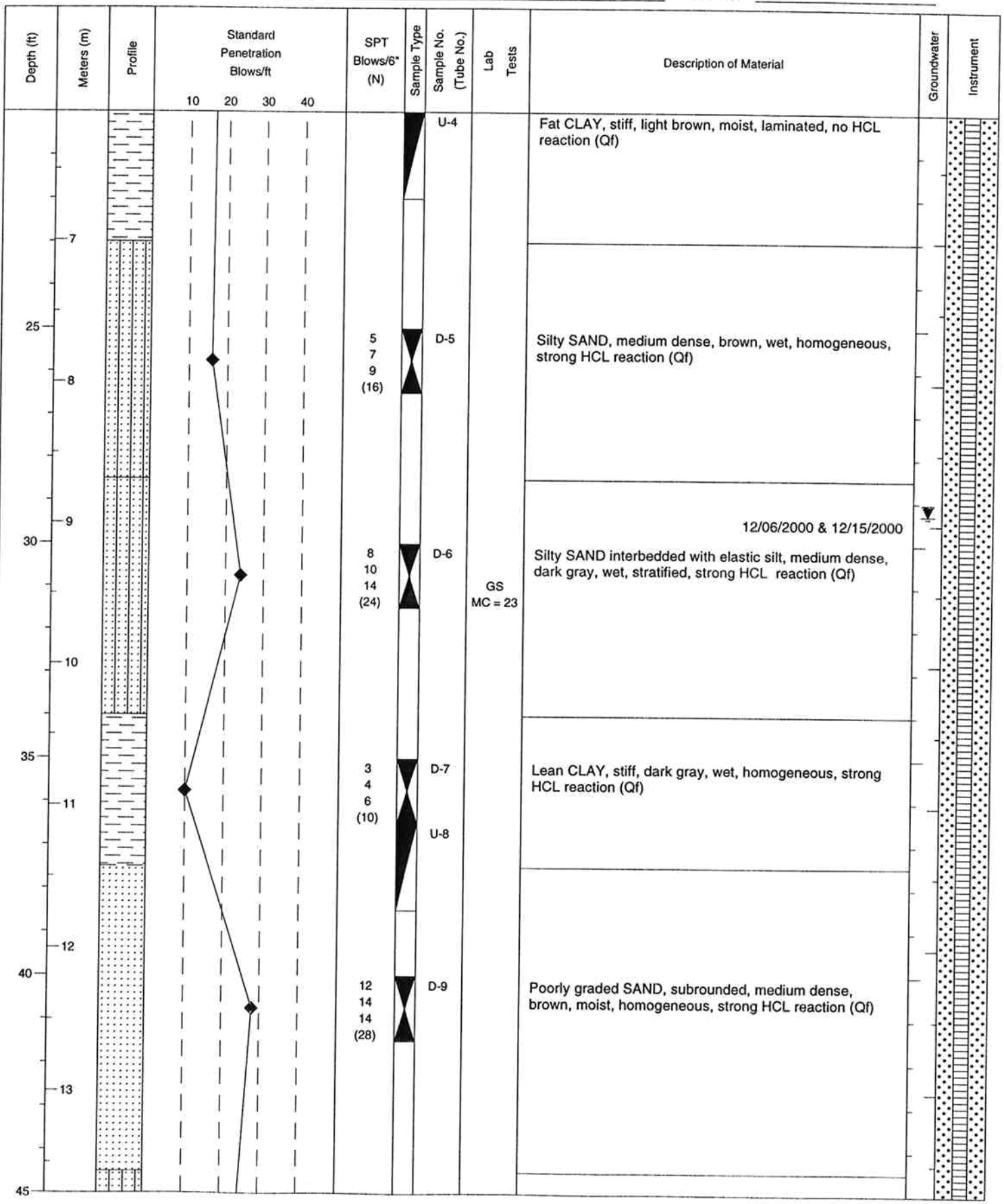

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Figure A-25 Page (2 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. DP- 5-00

Sheet 3 of 3

PROJECT WSDOT SR395 North Spokane Corridor Project

Job No. XL1154

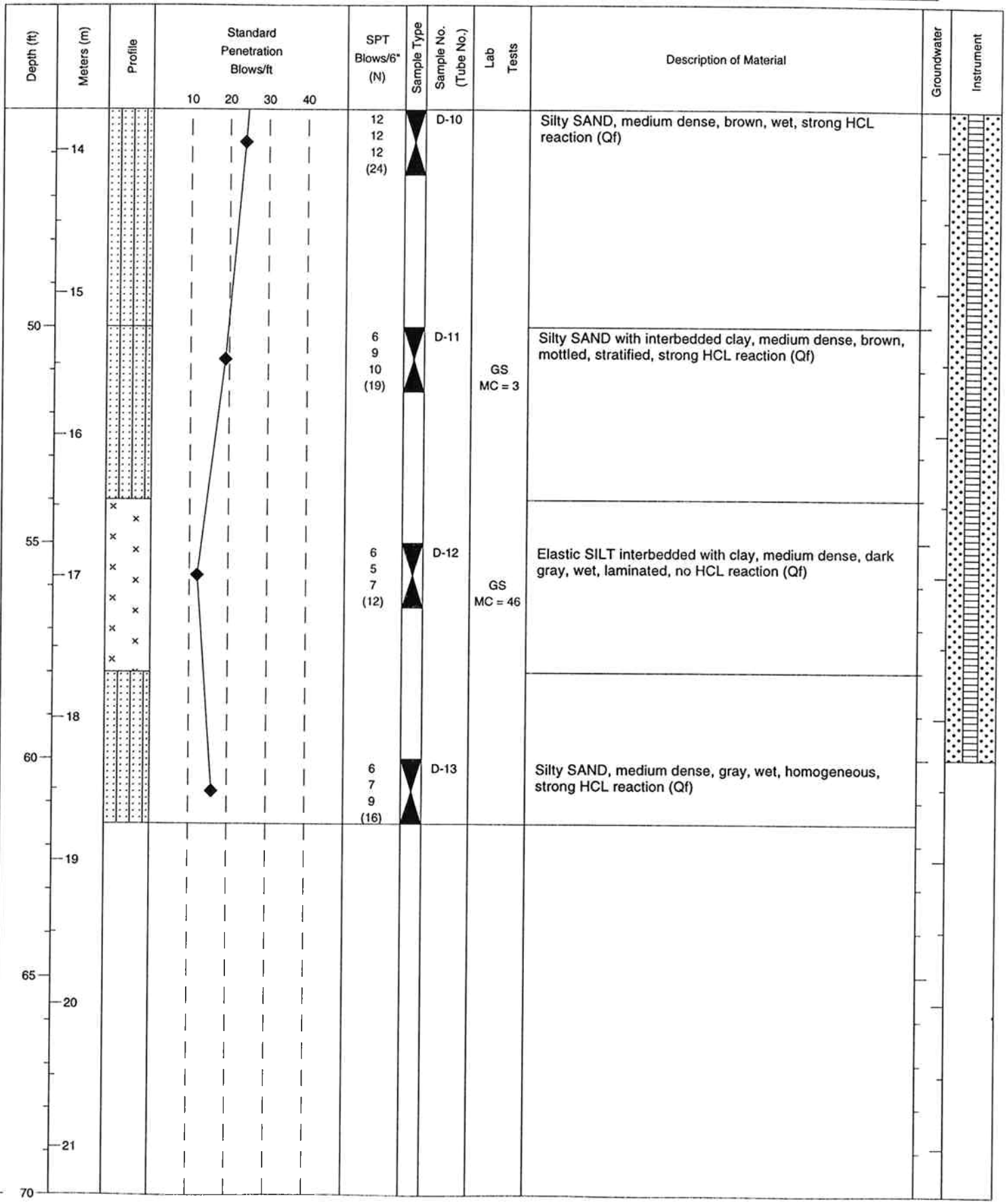

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Figure A-25 Page (3 of 3)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2-1-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **468+19.826** Offset **-122.77** C.S.

Equipment **B-61** Casing **8-in HSA** Ground El **1837.9 (560.19 m)**

Method of Boring **8-in Hollow Stem Auger**

Start Date **October 6, 2000** Completion Date **October 6, 2000** Sheet **1** of **2**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	1			6 7 8 (15)		D-1		Well graded SAND, subrounded to subangular, medium dense, dry, homogeneous, strong HCL reaction (Qf)		
10	3			6 6 8 (14)		D-2		Well graded fine to medium SAND subrounded to subangular, medium dense, very dark grayish brown, moist, homogeneous, strong HCL reaction (Qf)		
15	5			6 6 8 (14)		D-3		Well graded fine to medium SAND, subrounded to subangular, very dark grayish brown, medium dense, moist, homogeneous, strong HCL reaction (Qf)		
20	6									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01 11:03:26 A2

Figure A-26 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2-1-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
				3 5 7 (12)		D-4		Lean CLAY, stiff, brown, moist, homogeneous, strong HCL reaction (Qf)		
25	7			4 4 6 (10)		D-5		Lean CLAY with silt and sand, stiff, brown, moist, disrupted, weak HCL reaction (Qf) Silty fine SAND, subrounded to subangular, loose, brown, wet (Qf)		
30	8 9			3 4 8 (12)		D-6		Lean CLAY, stiff, light olive brown, moist, homogeneous, weak HCL reaction, bluish gray tint in some portions of sample (Qf)		
35	10 11			14 15 20 (35)		D-7		Silty fine SAND, subrounded to subangular, dense, wet, brown, homogeneous, strong HCL reaction (Qf)		
40	12			11 11 16 (27)		D-8		Silty fine micaceous SAND, subangular, dense, wet, brown, homogeneous, strong HCL reaction (Qf)		
45	13									

SOIL I:\PROJECT\244\004.10\WDOTPH1A.GPJ WSDOT.GDT 2/1/01 11:03:27 A2

Figure A-26 Page (2 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2-2-00**

PROJECT **WSDOT SR395 North Spokane Corridor Project** Job No. **XL1154**

Spokane, Washington S.R. **395**

Station **468+26.879** Offset **146.51** C.S.

Equipment **Morooka MST-1100** Casing **HWT** Ground El **1838.1 (560.25 m)**

Method of Boring **HQ casing advance**

Start Date **September 27, 2000** Completion Date **September 27, 2000** Sheet **1** of **2**

Depth (ft)	Meters (m)	Profile	Standard Penetration Blows/ft (10 20 30 40)	SPT Blows/6" (N)	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
5	1–2			4 5 8 (13)		D-1		Well graded SAND, rounded to subrounded, medium dense, wet, homogeneous, weak HCL reaction (Qf)		
10	3–4			5 5 6 (11)		D-2		Well graded SAND, rounded to subrounded, medium dense, wet, homogeneous, weak HCL reaction (Qf)		
15	5			7 8 8 (15)		D-3		Well graded SAND interbedded with nodules of elastic silt, subrounded to rounded, medium dense, wet, homogeneous, weak HCL (Qf)		
20	6									

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Figure A-27 Page (1 of 2)

LOG OF TEST BORING

Washington State Department of Transportation

HOLE No. **US2-2-00**

Sheet **2** of **2**

PROJECT **WSDOT SR395 North Spokane Corridor Project**

Job No. **XL1154**

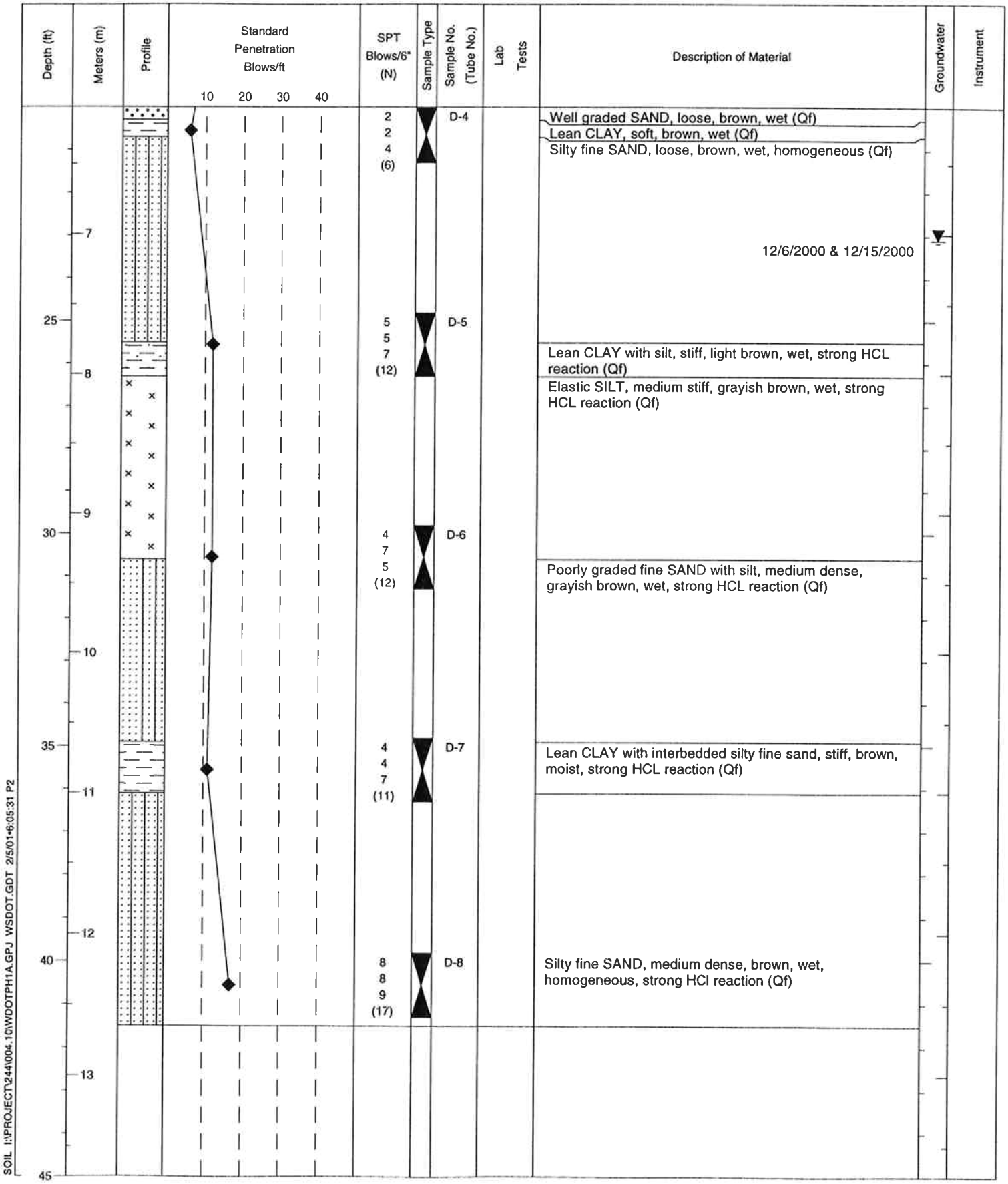

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Figure A-27 Page (2 of 2)

APPENDIX B

Laboratory Testing

APPENDIX B
LABORATORY TESTING

Natural moisture content and dry density determinations, sieve analyses, and Atterberg Limit determinations were conducted by Soil Technology of Bainbridge Island, Washington (under subcontract to Landau Associates) on representative samples recovered from the borings for the purpose of classification and evaluation of pertinent engineering properties of soil types encountered. Laboratory testing was performed in general accordance with the American Society of Testing and Materials (ASTM) standard test procedures, which are described below. The samples were checked against the field log descriptions, which were updated where appropriate in general accordance with ASTM D2487, *Standard Test Method for Classification of Soils for Engineering Purposes*.

Natural Moisture Content

Natural moisture content determinations were performed on soil samples recovered from the borings in general accordance with ASTM D2216. The results are presented in Table B-1 in this appendix and on the boring logs in the column labeled "Lab Tests."

Grain Size Analyses

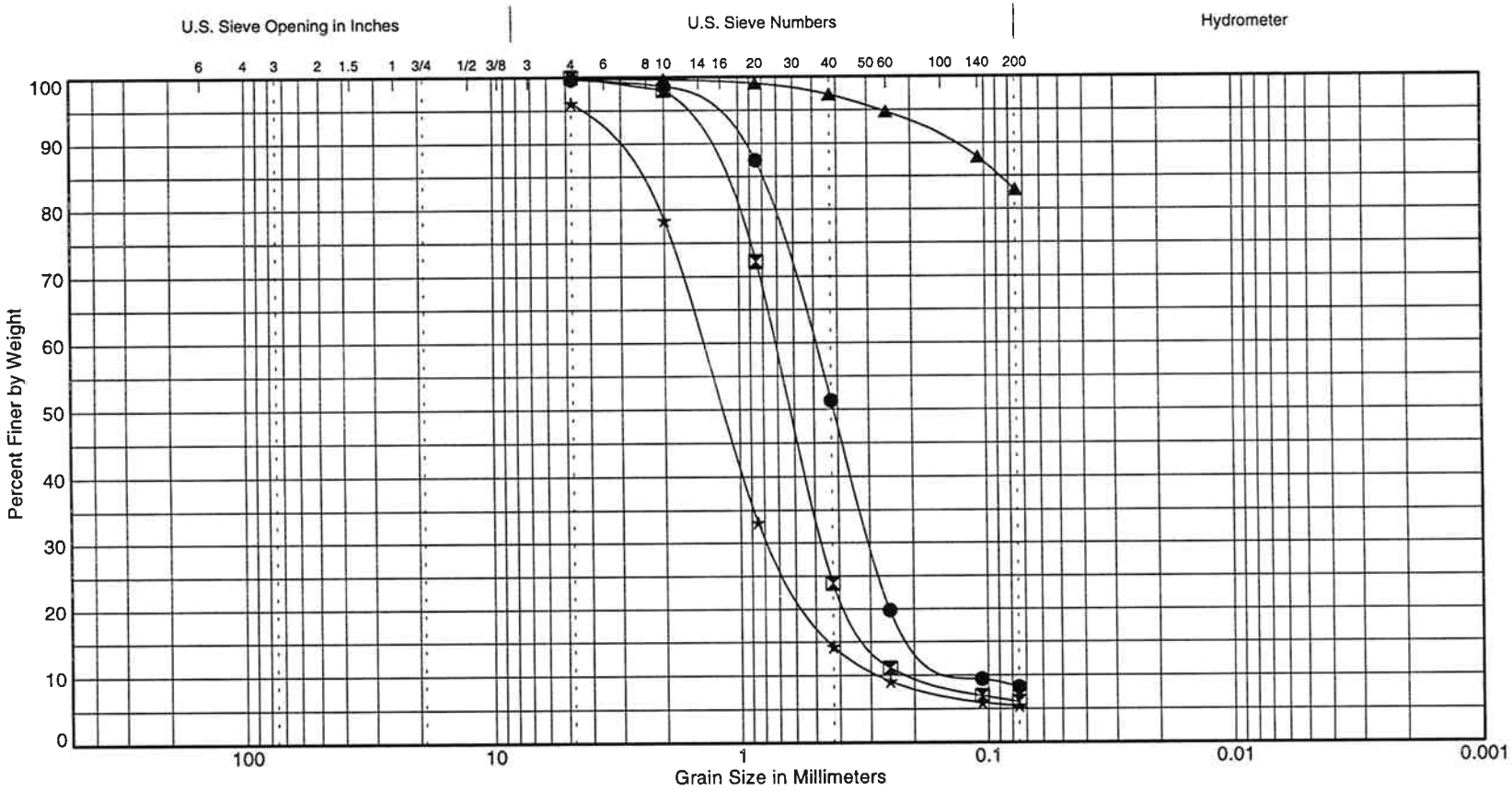
Grain size analyses were performed on representative soil samples obtained from the borings in accordance with ASTM D422 to provide an indication of their grain size distribution. The results of the sieve analyses are presented on Figures B-1 through B-3 in this appendix. Samples on which sieve analyses were completed are designated with a "GS" in the column labeled "Lab Tests" on the summary logs.

Atterberg Limit Determinations

Atterberg Limit determinations were performed on representative soil samples obtained from the borings in general accordance with ASTM D4318 to determine the liquid limit (LL), plastic limit (PL), and plasticity index (PI). The results of the Atterberg Limit determinations are presented on Figure B-4 in this appendix. Samples on which Atterberg Limit determinations were completed are designated by "AL" in the column labeled "Lab Tests" on the summary logs.

TABLE B-1
MOISTURE CONTENT DATA

Exploration No.	Sample No.	Sample Depth (ft)	Moisture Content (%)
DP-1-00	D-5	25	4
DP-2-00	D-5	25	2
DP-3-00	D-3	15	30
DP-3-00	D-10	50	1
DP-4-00	D-7	35	33
DP-4-00	D-8	40	42
DP-4-00	D-9	45	50
DP-4-00	D-10	50	2
DP-5-00	D-6	30	23
DP-5-00	D-11	55	3
DP-5-00	D-12	60	46
DP-12-00	D-9	45	9
PH1-4-00	D-4	21	32
PH1-5-00	D-6	30	26
PH1-6-00	D-12	58	46



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	DP- 1-00	D-5	25.0	4	Poorly graded SAND with silt	SP-SM
⊠	DP- 2-00	D-5	25.0	2	Poorly graded SAND with silt	SP-SM
▲	DP- 3-00	D-3	15.0	30	SILT with sand	ML
★	DP- 3-00	D-10	50.0	1	Poorly graded SAND with silt	SP-SM

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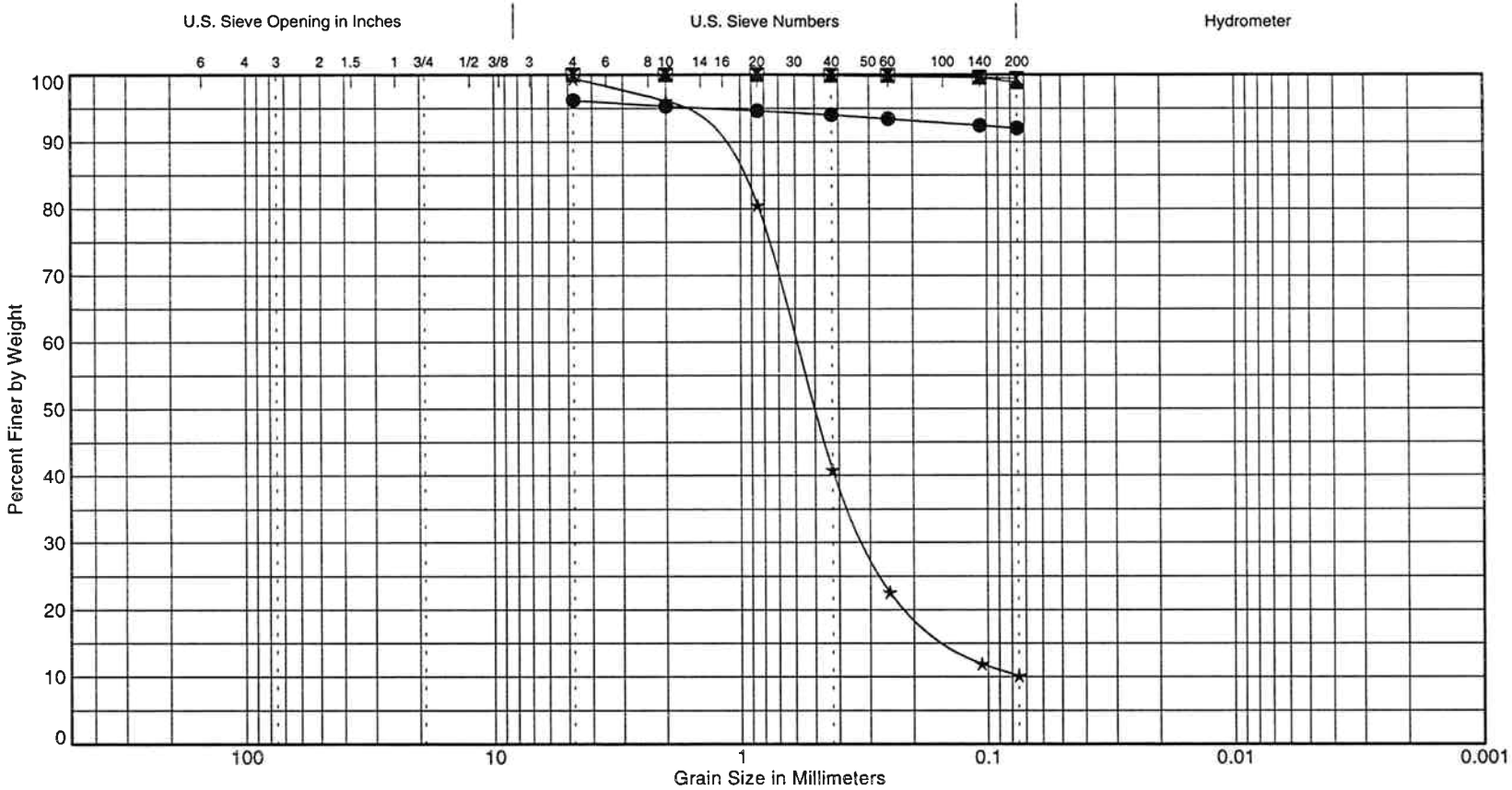
Grain Size Distribution

Figure B-1



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	DP- 4-00	D-7	35.0	33	SILT with sand	ML
⊠	DP- 4-00	D-8	40.0	42	Lean CLAY	CL
▲	DP- 4-00	D-9	45.0	50	Lean CLAY	CL
★	DP- 4-00	D-10	50.0	2	Poorly graded SAND with SILT	SP-SM

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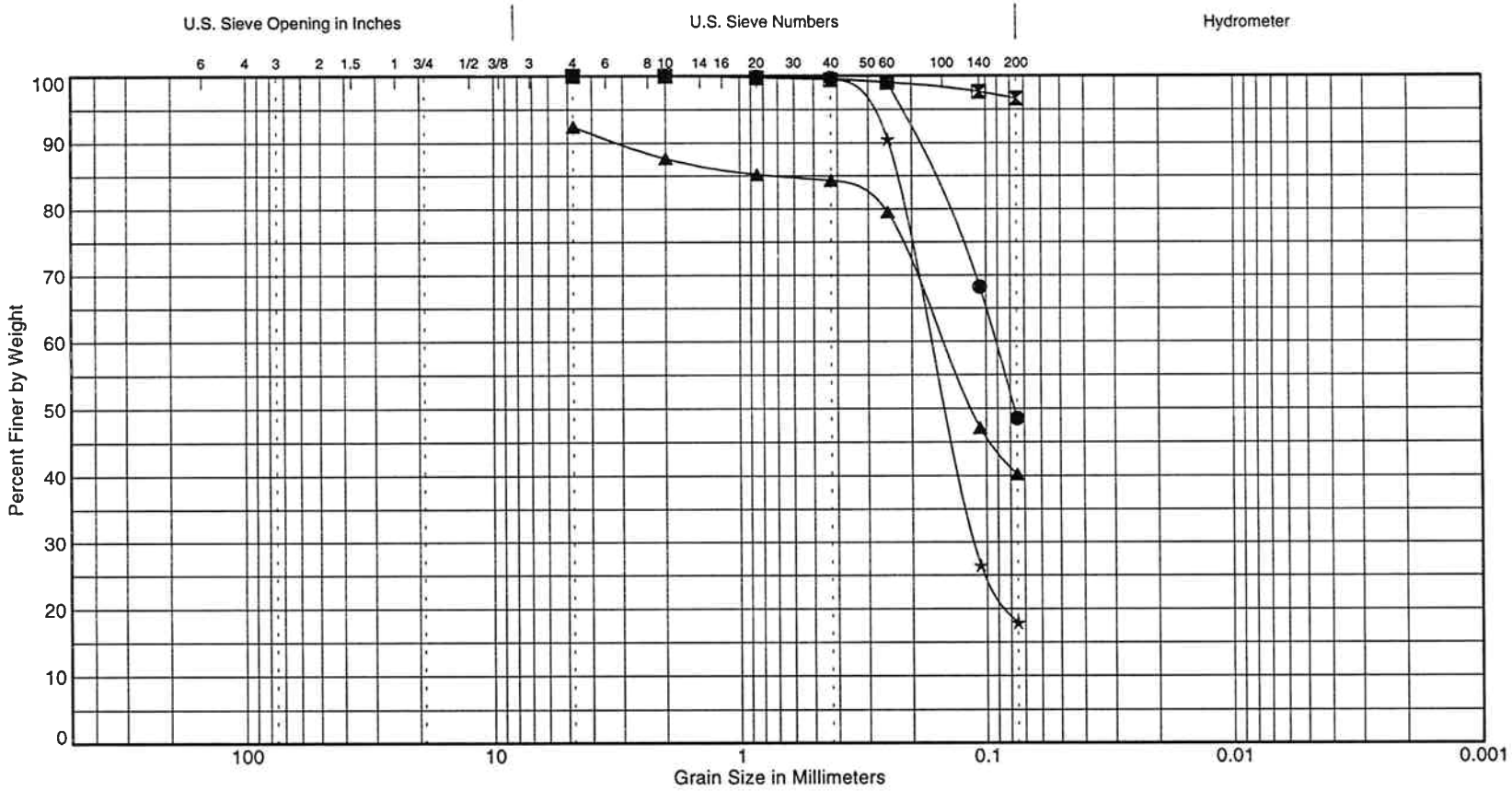
Spokane, Washington

Grain Size Distribution

Figure B-2



Cobbles	Gravel		Sand			Silt or Clay
	Coarse	Fine	Coarse	Medium	Fine	

Symbol	Exploration Number	Sample Number	Depth (ft)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	DP- 5-00	D-6	30.0	23	Silty SAND	SM
⊠	DP- 5-00	D-11	55.0	46	Silty SAND	SM
▲	DP- 5-00	D-12	60.0	3	SILT	ML
★	DP-12-00	D-9	45.0	9	Silty SAND	SM

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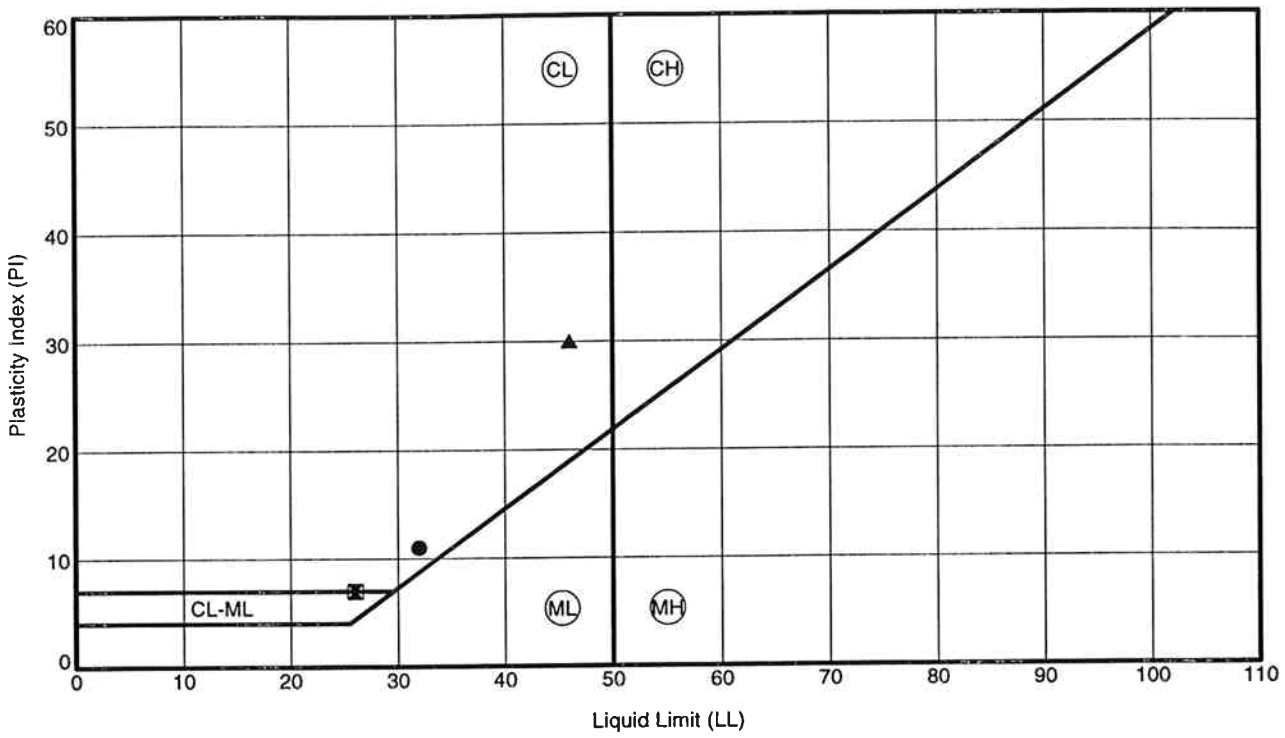
Spokane, Washington

Grain Size Distribution

Figure B-3



ATTERBERG LIMIT TEST RESULTS

Symbol	Exploration Number	Sample Number	Depth (ft)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Natural Moisture (%)	Soil Description	Unified Soil Classification
●	PH1-4-00	D-4	21.0	32	21	11	27	Lean CLAY	CL
⊠	PH1-5-00	D-6	30.0	26	19	7	26	Lean CLAY	CL
▲	PH1-6-00	D-12	58.0	46	16	30	39	Lean CLAY	CL

ASTM D 4318 Test Method

XL1154 12/21/00 I:\PROJECT\244\004.10\WDOTPH1A.GPJ ATTERBERG LIMITS FIGURE

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Spokane, Washington

Plasticity Chart

Figure B-4